



**MONTGOMERY WATSON**

August 30, 1996

US EPA RECORDS CENTER REGION 5



464474

Ms. Sheri L. Bianchin  
Remedial Project Manager  
Superfund Division  
United States Environmental Protection Agency  
77 West Jackson Boulevard  
Chicago, Illinois 60604

Response to: U.S. EPA's August 5, 1996 Approval of the First Draft,  
Technical Memorandum, Dewatering/Barrier Wall Alignment  
Investigation Report with Modifications  
American Chemical Service NPL Site,  
Griffith, Indiana

Dear Ms. Bianchin:

This letter is written in response to your letter entitled "Approval of the First Draft, Technical Memorandum, Dewatering/Barrier Wall Alignment Investigation Report with Modifications, American Chemical Service NPL Site, Griffith, Indiana" dated August 5, 1996.

With this letter, we are submitting revised pages for the Dewatering/Barrier Wall Technical Memorandum which respond to your comments. Our responses to the specific comments follow.

#### **ENCLOSURE**

Required Modifications for First Draft, Technical Memorandum,  
Dewatering/Barrier Wall Alignment Investigation Report, American  
Chemical Services NPL Site, Griffith, Lake County, Indiana.

#### **General Comments**

1. This comment requires no response. U.S. EPA's opinion is that depending upon the nature and extend of contamination including free-phase contamination (i.e., non-aqueous phase liquids), and the design of the barrier wall, the walls may not serve as a long-term containment, but simply a component of treatment.
2. Acknowledgment should be made in the report that contamination not addressed with dewatering/barrier wall system, must be addressed through the overall site remedy.

**Section 4.4 has been added on Page 11 to discuss the new revised and U.S. EPA approved Barrier Wall Alignment. It includes the sentences, "It is possible that some areas of waste will remain outside the barrier wall. To the extent that such areas do exist, they will be appropriately addressed by the overall site remedy."**

3. According to the soil boring logs in Appendix B, SB216 indicated that there were two field analyses performed—one at 11-12 feet for PCBs and one at 13.5-15.5 feet for PCBs and VOCs. However, Table 2, does not list the 11-12 feet PCB sample. This should be included in the table. Also, when referencing Figure 2, SB205A was utilized for the barrier wall alignment but was not included in Table 2. Please revise accordingly.

**Table 2 in the Technical Memorandum is correct. The soil boring log for SB216 contained a typographic error. The sample from 11-13 feet was not analyzed in the field. The boring log has been revised accordingly, and Appendix B1, containing all the boring logs is being re-submitted to replace Appendix B1 in the previous submittal.**

4. Not all samples presented in Appendix E have an IEA Assigned Number Index. Please provide this information for use in identifying what laboratory sample number corresponds to what SB sample.

**Notations have been added to laboratory data sheets that did not have a cross reference to the sampling location in the first submittal of the Technical Memorandum. A new copy of Appendix E is being provided, to replace the Appendix E in the original Technical Memorandum.**

5. Please indicate if the results submitted from the confirmatory samples were reported in dry or wet weight. This information is helpful when comparing the field results with the laboratory results.

**The sample analyses were reported in dry weight.**

6. Please provide an explanation as to why the samples with the highest PID reading for SB 109 (11-13'), SB114 (18.5-20.5'), and SB127 (11-13') were not analyzed.

**The PID readings from SB109 were relatively low and consistent among sample intervals at this location. The decision in the field was to collect the sample volume from the interval exhibiting the greatest visual contamination. Samples from SB114 had several areas with high PID readings. The samples with the greatest visual indication of contamination (i.e. oily and/or dark or colored in comparison with the natural brown sand color) were selected for laboratory analysis. The sample from the 11-13 foot interval of SB127 was not analyzed since the sample from the depth of 6-8**

feet had already exceeded the PCB waste criteria of 10 ppm in the laboratory analysis. New text has been added at the beginning of Section 3 on Page 5 to provide more detail regarding the waste identification and sample selection process that was conducted in accordance with the approved work plan.

7. Please explain why some of the soil borings had only PCB or only VOC field analyses performed (i.e. SB152, SB205). In addition, several discrete sample depths within the sample soil boring indicated having only PCB or only VOC analyses performed (i.e. SB115 at 6-8'; SB 123 at 6-8'; SB124 at 6-8' and 11-13'). It would seem logical that the sample location with the highest PID reading would be analyzed for PCBs and VOCs.

Sample were selected for VOC and PCB analysis on the basis of visual indication, PID readings, and the results of hydrophobic dye testing of soils samples in accordance with the approved Work Plan. In general, sample intervals with the highest PID reading were selected for the VOC analysis, sample intervals that had an oily sheen or were shown by the hydrophobic dye to contain oil were submitted for the PCB analysis. We did not consider PID readings to be the best indicator of PCB concentrations, since PCBs are not volatile compounds. New text has been added at the beginning of Section 3 on Page 5 to provide more detail regarding the waste identification and sample selection process that was conducted in accordance with the approved work plan.

8. SB223 at 18.5-20.5' had a PID reading of 51 meter units. However, there is no indication that field analysis was performed. Yet, when referring to Table 2, a field analysis result is listed. Please make the necessary corrections.

Table 2 is correct. The boring log for SB223 contained a typographical error. The typographical error has been corrected on the boring log. A new copy of Appendix B1 with several correct logs is attached to replace Appendix B1 in the previously submitted Technical Memorandum.

9. When comparing the Field PCB results to IEA Laboratory results, the field PCB results are higher than those of IEA Laboratory. PCBs are not easily lost in transit to the laboratory. Please provide an explanation for the difference in the results.

Many of the split-spoon samples, particularly in the on-site area, showed stratification and high variability across only a few inches of soil matrix. Field screening was conducted first, and the field screening techniques typically require only a very small volume of material. After the field screening was completed, sample jars were filled with the remaining material from the contaminated zone. These were later sent to the laboratory for analysis. In cases where the zone of contamination was only a fraction of an inch in thickness, the sample jar would necessarily be filled with some material

that was less than the most highly contaminated. The sample volume submitted for laboratory analysis would be representative of several inches of the split-spoon sample. In a case where the zone of contamination was very thin, the laboratory analysis would in effect be on a sample consisting of a homogenized volume of both the higher contaminated and the volume of lesser contaminated soil matrix necessary to complete the sample volume.

During the field investigation, we recognized that this process might result in higher field screening results and lower laboratory results. However, this represents a bias toward false positives rather than false negatives and for the purpose of this investigation, false positives were acceptable, whereas false negatives were not.

10. In the Pre-Design Work Plan, 15 samples from the Still Bottoms/Treatment Lagoon Area and 11 samples from the Off-Site Containment Area, totaling 26 samples, were to be sent to IEA as confirmatory samples. This number was selected to represent 25% of the field analytical samples. U.S. EPA understands that the number of soil borings and samples to be collected changed. However, the number for the confirmatory samples is inadequate, especially for the VOCs, and does not fulfill the objectives set fourth in the Pre-Design Work Plan and Pre-Design QAPP. Discuss why 25% of the field analytical confirmatory samples were not utilized.

Samples submitted to off-site laboratory were selected in accordance with the Work Plan, which was to analyze material from along the barrier wall alignment, on the basis of two criteria: samples exhibiting greater than 8,000 ppm total VOCs in the field GC analysis and samples exhibiting greater than 10 ppm total PCBs in the field screening analysis. These criterion were followed in selecting the total number of samples for laboratory analysis. We are not aware of a criterion in the approved Work Plan, or the QAPP or Field Sampling Plan indicating that 25% of the samples were to be analyzed.

11. With the limited information provided regarding the QA/QC criteria utilized by the IEA Laboratory, it is difficult to determine if the proper protocols were followed. Please provide further information regarding QA/QC criteria and protocols, and whether the approved QAPP was followed.

Montgomery Watson performed data validation on the laboartory samples analyzed by IEA, Inc. All sampling analyses were performed in accordance with the Pre-Design Investigation QAPP, following the designated protocols and QA/QC. Montgomery Watson maintains on file, the data validation package for each analysis. The data validation file is a thick packet of information and so has not been included with each document. However, one copy each is being provided to U.S. EPA, IDEM, and Black & Veatch. Additional copies can be requested by contacting Montgomery Watson.



12. The 4th sentence states that moving the barrier wall outward is not a "viable solution" apparently because of the relatively thick layer of refuse encountered at SB205A. However, in the next paragraph, 5th sentence, excavation and backfilling are proposed in the SB201 and SB210 locations to address the problems associated with refuse and their effects on barrier wall constructability. Even though the barrier wall alignment has been previously approved, discuss why the same rationale does not apply for the area near the SB205 and SB205A locations as SB 20 and SB 210 locations.

**Soil Borings SB201 through SB210 were selected along the fence line between the Off-Site Area and the Griffith Town Landfill. The soil borings in the southern part of the off-site area, both during this investigation and previous investigations indicated that refuse, (apparently municipal landfill waste) has been incorporated into the upper 3 to 10 feet of the off-site area. The water table is generally found a eight to ten feet below the ground surface, and the confining clay layer is found another ten to 15 feet deeper.**

**When high VOC contamination was found in a thin zone at a depth of 3.5 to 5.5 feet at SB205, the next boring was off-set 40 feet to the west, for soil boring SB205A. This boring was made within the Griffith Town Landfill, and it indicated that the refuse extended 17.5 feet below ground surface. It is our opinion that barrier wall technology is not viable in refuse that may consist of 40 to 50 percent void space. The single incident of high VOCs in a thin shallow layer of shallow refuse did not justify moving the entire wall to the west into the Landfill where the much greater thickness of refuse was found to exist.**

#### Specific Comments

**13. Page 4, 2nd bullet, 2nd sentence.**

Remove this sentence, as it is irrelevant. The EPA oversight contractor is not authorized to approve or disapprove field decisions. (The oversight contractor may facilitate discussions with the U.S. EPA who approve or disapprove field decisions.)

**The second bullet item at the top of Page 4 has been deleted as requested.**

**14. Page 8, 3rd paragraph.**

(It) appears that the PCB contamination is localized at B127, and moving the alignment north is prohibited by the tanks. However, it may be possible to excavate and remove the contaminated soils during the installation of the barrier wall. Include a discussion of this scenario, including confirmational sampling.

A new alignment has been proposed and approved by U.S. EPA (discussed in Section 4.4 of the revised Technical Memorandum). The new alignment will be more than 200 feet north of SB127 and therefore the contamination at that location will not be intersected during the construction of the barrier wall.

**15. Page 10, 4th paragraph.**

Placement of the alignment just east of SB205 as suggested here, and indicated on figure 2, will exclude soils classified as waste (based on paragraph 3). If the alignment is to remain as proposed, removal action (with conformational sampling) will be necessary to ensure that soils exceeding waste criteria are removed.

**The contamination found in boring SB205 was representative of a thin zone above the water table. It was not representative of a mass of waste. The composite results of all the borings indicate that the occurrence of high xylenes is a local anomaly not requiring excavation and removal.**

**In any case, it was not one of the objectives of the Technical Memorandum to define the procedure to handle an occurrence of contamination along the alignment; that is one of the objectives of the Barrier Wall Design. We have had other conversations with U.S. EPA and will be submitting a proposal to the Agency regarding the overall topic of the excavation, handling, and staging of the refuse material during the construction of the barrier wall, as agreed through these discussions.**

**16. Section 4.3, page 10, paragraph 5.**

This section discusses the waste refuse and associated void spaces that would limit the construction of a barrier wall in this location. This section also provides possible solutions to this challenge. In the possible solution it is suggested that a trench be excavated to the base of the refuse along the alignment location and backfill with imported material. Please provide additional information about the source and the integrity of this soil.

**The technical memorandum is not a design document. Its purpose is to provide a characterization of the site and present potential problems that may be encountered, so that the appropriate construction procedure can be designed. The possible solutions have been developed and evaluated in the design process. The conclusions and solutions will be reported in the Design document.**

**17. Table 3.**

The rigid-wall permeability results provided for locations SB-206 and SB-151 are reversed, based upon the data provided in Appendix F. In addition, the "USCS" designation provided for SP-212 is not clear and is inconsistent with the data in Appendix F. These errors need to be corrected.

**The USCS classification for the Shelby tube sample listed at the bottom of Table 3 contained a typographical error. The table has been corrected and is attached to replace Table 3 in the previously submitted Technical Memorandum.**

**18. Appendix E, SDG Narrative Volatile Fraction, page 1, paragraph 1 and 4.**

Two different Environmental Protection Agency Statements of Work are mentioned as having been followed. The first (paragraph 1) references EPA 1/91 SOW, while the other (paragraph 4) discusses the purge and trap apparatus criteria in the SOW for OLMO3. The most current revision of the EPA SOW for organics and inorganics is to be utilized throughout the project. A previous document evaluation of the QAPP has also addressed this issue. If any other revision has been used, the documentation may be deemed inappropriate for use. Clarify this apparent discrepancy.

**The case narrative in the Appendix E incorrectly referenced the U.S. EPA SOW. In fact, IEA followed the U.S. EPA SOW 1/91 for organic analysis of all samples for this project. Appendix E has been revised and a new copy is provided to replace the previous version in the Dewatering/Barrier Wall Technical Memorandum.**

**19. Appendix E, Chain of Custody, Collection of 3 Soil Boring Samples.**

The COC states that the analytical run is to meet CLP DQO Level 3. The Pre-Design Work Plan QAPP indicates that activities are not only meant for engineering design purposes but, also to determine extent, detect/monitor compliance, investigate wetlands and abandoned wells. The equivalent of DQO Level 4 is required by the QAPP. (CHECK OUT ) If the associated data is to be used for any other purpose, it may be deemed unsatisfactory.

**The approved Work Plan for the Dewatering/Barrier Wall Work Plan and the QAPP indicates that DQO level 3 data was to be used. This is consistent with the data requirements for designing a remedy. Therefore, the analysis was in accordance with the Planning Documents and the requirements of the project.**

**20. Appendix E, laboratory Reports for PCBs.**

The Pre-Design Work Plan QAPP indicates only IEA of Cary, North Carolina will perform the analyses of samples collected. Yet, several of the Organic data Sheets indicate the reported results were faxed from a laboratory in Connecticut. Explain this further. If a lab other than IEA's North Carolina facility has been utilized, provide additional information about the laboratory. It is important to follow the approved QAPP.

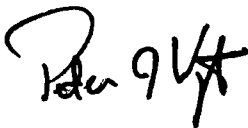
**It is not uncommon practice for contracted laboratories to distribute sample analysis among their own facilities which operate under the same QAPP and protocol, in order to balance work load and assure holding times are met. In this situation, the Cary Laboratory experienced instrument failure due to an ice storm. In order to meet the holding times for the organic analysis, several of the samples were shipped to IEA's laboratory in Connecticut, and analyzed these following the same QAPP and protocol that the Cary facility would have used.**

Several changes have been made to the text, tables, figures and several appendices of the Dewatering/Barrier Wall Alignment Investigation Report in response to these comments. Replacement pages have been provided with this response-to-comments letter to update the Technical Memoranda previously submitted to you in three-ring binders.

If you have further questions or require additional copies, please don't hesitate to call me at (630) 691-5020.

Very Truly Yours,

MONTGOMERY WATSON INC.

A handwritten signature in black ink, appearing to read "Peter J. Vagt", with a stylized flourish at the end.

Peter J. Vagt, Ph.D., CPG  
Vice President

Enclosures: As stated

cc: Holly Grejda, IDEM  
Steve Mrkvika, B&BWS  
ACS Technical Committee

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EPA Comment Number  
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Margin adjacent to  
changed text.

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## INTRODUCTION

### 1.1 OBJECTIVES

This Technical Memorandum summarizes the results of investigation activities conducted to delineate the alignment and support the design of the dewatering/barrier wall at the ACS NPL site in Griffith, Indiana. The purpose of the dewatering/barrier wall is to prevent migration of contaminants from the Still Bottoms/Treatment Lagoon and Off-Site Containment Area (OSCA) to the site boundary. The dewatering/barrier wall investigation was performed in accordance with the January 12, 1996 Dewatering/Barrier Wall Alignment Pre-Design Work Plan approved by U.S. EPA and IDEM. It was originally proposed to install two separate barrier walls, one for the Still Bottoms/Treatment Lagoon Area, the other for the Off-Site Containment Area. Data were collected and evaluated for the investigation to accomplish the following objectives:

- Determine the lateral extent of waste materials at the locations where the barrier wall alignment is proposed. (According to the ROD, wastes are classified as soils with total VOC concentrations of 10,000 ppm (1 percent) or greater, and/or PCB concentrations of 10 ppm or greater.)
- Collect field and laboratory geotechnical information to support the design and construction of the barrier wall.
- Define the elevation of the top of the clay confining layer along the barrier wall alignment.
- Collect soil samples for potential mix design testing of a soil-bentonite barrier wall.
- Collect groundwater samples for potential compatibility testing of the proposed barrier wall.
- Provide sufficient information regarding site conditions to barrier wall subcontractors intending to propose and bid on barrier wall technology and design.

Samples of soil and groundwater were collected for soil-bentonite wall mix and compatibility testing. The soil-bentonite design and compatibility testing will be performed by the barrier wall subcontractor during barrier wall final design if a soil-bentonite mix design as needed to complete the technology selection process.

## 1.2 SCOPE OF WORK

Field investigations for the barrier wall alignment generally consisted of drilling soil borings extending to the underlying clay confining layer along the proposed alignment of the barrier walls, and assessing the presence of waste materials through visual inspections and field and laboratory analyses of selected soil samples. If material was found that met or exceeded the criteria for "waste", additional borings were conducted outward from the waste area to determine the extent of waste materials.

Field analysis of soil samples consisted of using field test kits for analysis of PCBs, a field gas chromatograph (GC) for analysis of total VOCs (defined as the sum total of the concentrations of detected target VOCs), and hydrophobic dye to test for the presence of free-phase materials. Duplicate soil samples were submitted to the laboratory for analysis when field analysis indicated VOC concentrations greater than 8,000 ppm or PCB concentrations approaching or exceeding 10 ppm.

Representative soil samples for geotechnical analyses were collected from borings located along the barrier wall final alignment and submitted to the laboratory for grain size analysis and hydraulic conductivity/permeability testing.

Soil borings were drilled during the barrier wall investigation to gather geotechnical information to design Pilot Test Cells in the Still Bottoms/Treatment Lagoon Area and the Off-Site Containment Area. Information gathered during the test cell soil borings included standard penetration testing, field soil classification and the depth to the clay confining layer. Field and laboratory analyses were not performed on soil samples collected from these areas.

## PROCEDURES

### 2.1 DRILLING

A total of 23 soil borings were advanced in the Off-Site Containment Area (SB201 through SB223) and 48 soil borings were drilled in Still Bottoms/Treatment Lagoon Area (SB101 through SB144 and SB149 through SB152). The locations of the soil borings are shown in Figure 1. Soil boring location coordinates, ground surface elevations, and depth to the clay confining layer are presented in Table 1. Work was conducted following the SOW and SOPs approved by the U.S. EPA on January 12, 1996.

The intervals between soil boring locations ranged from 25 feet in the area south of the fire pond area to approximately 200 feet along the eastern perimeter (Figure 1). In general, locations were more closely spaced in areas where detailed information was required regarding the extent of waste materials. Ground surface elevations, and northing and easting coordinates were surveyed to the nearest 0.1 foot for each boring by Area Survey of Orland Park, Illinois. The survey report for the barrier wall investigation is presented in Appendix A.

Soil borings were advanced approximately two feet into the top of the clay confining layer and logged by a geologist at both areas of the site. The depth to clay and elevation of the top of clay for all soil boring locations are also included in Table 1. The elevation of the top of the clay confining layer ranged from approximately 617 feet to 622 mean sea level (msl) feet throughout the site area. Soil boring logs for borings located along the proposed final alignment are presented in Appendix B1. Pilot test cell soil borings are presented in Appendix B2. Remaining soil boring logs (borings not along the final alignment) are presented in Appendix B3.

Two drilling rigs were utilized concurrently to advance soil borings in the Still Bottoms/Treatment Lagoon Area and Off-Site Containment Area during the field investigation. An all-terrain vehicle (ATV) mounted drill rig was used to access the soil borings in the Off-Site Containment Area, whereas a truck-mounted rig was used in the Still Bottoms/Treatment Lagoon Area. All borings were drilled with 3.25-inch inside diameter (I.D.) hollow stem augers. Following completion of the borings, the boreholes were backfilled to the ground surface using a bentonite-cement grout. Soil boring locations were subsequently surveyed by Area Survey (Appendix A).

Soil boring and sample collection were conducted in accordance with the U.S. EPA and IDEM approved, January 12, 1996 Dewatering/Barrier Wall Alignment Pre-Design Work Plan and the Specific Operating Procedure (SOP) for drilling and soil sampling, with the following exceptions:

- Soil borings SB109 through SB113, SB134 through SB136, and SB150 through SB152 in the Still Bottoms/Treatment Lagoon Area and borings SB206, SB212, SB215, SB217, and SB221 in the Off-Site Containment Area were continuously sampled (i.e., 1 to 3 ft, 3 to 5 ft, etc.) to the bottom of each boring in order to collect additional soil volume for geotechnical laboratory analyses.

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## 2.2 SAMPLE COLLECTION

Soil samples were collected from borings for field and laboratory analyses. Samples were collected in the field according to the following strategy outlined in the Dewatering/Barrier Wall Alignment Pre-Design Work Plan:

- One to two soil samples per boring were collected based on visual observations, (i.e., black or brown staining, presence of free phase material) for PCB field screening using an Ohmicron Environmental Diagnostics Rapid Assay Soil Test.
- One to two soil samples per boring were selected based on visual observations and PID readings for VOC analyses with the field GC.
- One soil sample per boring, located at the interface of the sand and clay confining layer, was collected and analyzed for the presence of free phase material utilizing the hydrophobic dye testing technique.
- Four 30-inch long, 3-inch diameter Shelby tube samples were collected from the areas (two from the Off-Site Containment Area and two from the Still Bottoms/Treatment Lagoon Area). The Shelby tube samples were collected from borings located along the proposed final alignment and one sample from each Shelby tube was analyzed for permeability using the falling head method.
- Twenty-two soil samples (from 11 borings) were collected along the proposed final alignment and analyzed for grain size distribution (ASTM D422).



## SAMPLE ANALYSIS

Screening methods were used to select samples in the field, for submittal to the off-site laboratory for analysis. The field screening process followed a sequence. First samples were evaluated using the field PID and visual observation to identify the zones of soil most likely to be highly contaminated. Next samples were selected from the zones appearing to be most contaminated, and evaluated by one or more of three field methods: 1) field evaluation for PCBs using the Ohmicron Environmental Diagnostics Rapid Assay Soil Test, 2) Field GC analysis to evaluate VOC concentrations, and/or 3) hydrophobic dye testing to identify free-phase oil in the samples. In some borings, all three analyses were conducted on a material from a single soil zone. On other borings, each analysis was conducted on a different soil zone. #6 #7

The results of the three field screening technologies were used to select samples for laboratory analysis for VOCs and PCBs. The most representative sample volumes were submitted for each analysis. Because of this sequence, there was not always an exact correlation between highest PID reading, highest field GC indication, and highest laboratory results. The most highly contaminated material, on the basis of the field screening methods, was used for the field analysis.

### 3.1 PCB ANALYSIS

Soil samples were analyzed for PCB field screening using the Ohmicron Environmental Diagnostics Rapid Assay Soil Test according to the User's Guide presented in the approved Dewatering/Barrier Wall Alignment Pre-Design Work Plan. Montgomery Watson field personnel were trained in the use and application of the method by an Ohmicron representative prior to starting the sampling analysis. The following exceptions occurred to the Work Plan:

- A dilution of five was used in Step 46 of the flow diagram (provided in the Barrier Wall Investigation Work Plan) rather than a dilution of twenty. The one to five dilution was used to achieve the 10 ppm cutoff (waste criteria) for PCBs in soil.
- No soil samples were selected for field PCB analysis from soil boring SB201 due to auger refusal at a depth of 8 ft (See boring log for SB201 in Appendix B1). Soil boring SB210 was used as a replacement for SB201.

Field screening results from the soil samples and proficiency samples analyzed are presented in Appendix C.

### **3.2 FIELD GC ANALYSIS**

Soil samples were analyzed for target VOCs using the field GC in accordance with the approved SOP with the following exceptions:

- Due to the high concentration of target VOCs in the soils, samples were run at a five-to-one dilution. Detection limits are subsequently five-times higher than the proposed limits.
- No soil samples were analyzed for VOCs from soil boring SB201 due to auger refusal at a depth of 8 ft (See boring log for SB201 in Appendix B2). ). Soil boring SB210 was used as a replacement for SB201.

Tabulated field GC screening results from each sample analyzed are presented in Appendix D.

### **3.3 LABORATORY ANALYSIS**

Soil samples which indicated VOC concentration greater than 8,000 ppm from the field GC analytical results, or PCB concentrations close to 10 ppm from the Ohmicron Rapid Assay Soil Field Test kit were sent to IEA Analytical Laboratories in Cary, North Carolina for confirmatory analyses in accordance with the Contract Laboratory Program (CLP) Statement of Work.

A summary of the analytical laboratory results and comparison to the field GC and PCB test kits are presented in Table 2. The complete IEA Laboratory report is presented in Appendix E.

### **3.4 GEOTECHNICAL LABORATORY ANALYSIS**

Geotechnical laboratory analysis performed at CGC, Inc. of Madison, Wisconsin included: grain size distribution (ASTM D422) for granular, Atterberg limits (liquid limit and plasticity index) (ASTM D4318), grain size distribution (ASTM D422), and flexible-wall permeability tests (ASTM D5084) for samples from the clay confining layer. Rigid-wall falling head permeability testing was performed on four Shelby tube samples of the confining clay layer.

Geotechnical laboratory testing for the soil-bentonite mix design and compatibility testing was not performed at this time. As previously stated, these tests will be performed by our

construction subcontractor, as necessary, to select a soil-bentonite mix for sections of the barrier wall to be constructed as a bentonite slurry wall.

Geotechnical analyses of selected soil samples were conducted in accordance with the Dewatering/Barrier Wall Alignment Pre-Design Work Plan, with the following exceptions:

- Soil samples collected for grain size analysis along the proposed final alignment were analyzed at intervals greater than 200 feet. Because the original 200-foot spacing of soil samples for grain size analysis was based on a shorter length of alignment, increasing the proposed alignment length served to extend the distance between samples. Due to the consistent geology over the entire site, little variation in grain size was noted between borings located more than 200 feet apart (see Section 7). Soil samples were collected from all borings conducted during the investigation and are currently being stored. These soil samples will be available for additional grain size analyses in the future, if necessary.
- A flexible-wall hydraulic conductivity/permeability test (ASTM D5084) was not performed on the one of the four clay confining layers samples (SB206) because there was insufficient volume of the undisturbed Shelby tube sample.
- In addition to the flexible-wall hydraulic conductivity/permeability testing, rigid-wall falling head permeability testing (U.S. Army Corps of Engineers Method EM 1110-2-1906 (VII)) was performed on the four Shelby tube samples. The U.S. Army Corps rigid wall falling head permeability test method was performed in order to model the worse case existing soil conditions of the clay confining layer at ACS.

## BARRIER WALL ALIGNMENT

### 4.1 PROPOSED FINAL ALIGNMENT

The proposed final alignment of the Dewatering/Barrier Wall is presented in Figure 2. The objective of the field investigation was to evaluate the suitability of the proposed barrier wall alignments. The approved Work Plan included a method to move the barrier wall alignment outward at locations where waste conditions were identified in the subsurface. Therefore, the final wall alignment was based on the preliminary estimate of location, modified by the field and laboratory analysis of soil samples for VOCs and PCBs.

### 4.2 STILL BOTTOMS/TREATMENT LAGOON

#### 4.2.1 North Alignment

At the request of the American Chemical Service Company, a revised alignment for the north section of the Barrier Wall was proposed to the U.S. EPA on July 30, 1996, after the completion of the first draft of this Technical Memorandum. The U.S. EPA approved the revised alignment (see Section 4.4) in a letter dated August 12, 1996. The remainder of Section 4.2.1 is important information regarding the site, so it will not be deleted from this Technical Memorandum. However, it no longer is relevant to the discussion of the Barrier Wall Alignment. #14

PCBs were detected greater than 10 ppm in soil borings SB112 and SB125 by field screening tests (Appendix C). This required the proposed alignment to be moved outward, further to the north. Soil borings SB127 and SB142 were advanced to the north of SB112 and SB125, respectively. No exceedences of waste criteria for PCBs (10 ppm) or total VOCs (10,000 ppm) were observed in soil samples analyzed in the field from soil boring SB142.

Field screening for PCBs in a soil sample collected from SB127 at a depth of 6 to 8 ft did not indicate an exceedence of the waste criteria (8.5 ppm). However, a duplicate sample sent to IEA for confirmatory analyses indicated a total PCB concentration of 44 ppm. The next deeper zone, from the 8 to 10 foot depth was also field-tested for PCBs but none were detected. On the basis of all the sampling results along the north alignment, the PCB exceedance at SB127 is considered a localized condition. Furthermore, there is an above ground liquid nitrogen storage tank and several other tanks located just to the north of the SB127 so it is not feasible to move the alignment north around a localized area. The soil

cuttings generated during any excavation for barrier wall construction in the vicinity of SB127 will be managed stored on site for future remediation.

#### **4.2.2 West Alignment**

Exceedences of PCBs (>10 ppm) were found in soil samples collected from soil borings SB122 and SB137, requiring the west portion of the alignment to be moved further to the west. PCBs were not detected greater than the waste criteria in soil samples collected from soil boring SB141, located approximately 26 ft west of soil boring SB137 (Figure 1). Therefore, the final alignment was oriented through this boring location. Additional soil samples collected along the revised alignment soil borings (SB140, SB136, SB139 and SB131) did not indicate PCB concentrations greater than 10 ppm.

#### **4.2.3 Railroad Spur Area**

Soil borings advanced at 25-foot intervals along the railroad spur indicated potential exceedences of PCBs with field screening (>10ppm) in soil samples collected from soil borings SB101, SB103, SB105, SB107, and SB108. These potential exceedences required that the southern section of the proposed barrier wall be moved further south. Soil boring SB120 was advanced approximately 100 feet south of soil boring SB105, near a building located immediately south of the railroad spur (Figure 1). Because PCBs were detected in SB120 greater than 50 ppm with field screening, the final alignment was moved further south.

A new potential alignment, 50 feet farther to the south from SB120, was selected for sampling and proposed to U.S. EPA. U.S. EPA approved the revised location, and a series of borings (SB129 through SB135) were made along the fence line marking the south boundary of the ACS facility (Figures 1 and 2). Field screening results suggested PCBs were present in soil borings SB129, SB134 and SB135 greater than 10 ppm, and positive results from the hydrophobic dye test were noted in soil samples collected at the sand/clay confining layer interface in soil boring SB134 (19 to 21 ft). The positive dye test results indicated the presence of free phase material at these locations.

Soil boring SB138 was advanced south of soil boring SB134, near the fence boundary of the ACS facility. PCBs were detected with field screening at 26.8 ppm in the 18.5 to 20.5 ft sample interval, indicating an exceedance of the "waste" criteria. The hydrophobic dye test from the same interval also indicated the presence of free phase material in this sample.

#### **4.2.4 Additional Soil Borings - Proposed Final Alignment**

The results of borings SB129 through SB135, and SB138 suggested that oil and PCB containing soil extended at least to the south ACS property line. Therefore, Montgomery Watson proposed to the U.S. EPA that borings be conducted for the consideration of connecting the two barrier walls into a single wall encompassing both the Still Bottoms/Treatment Lagoon Area and the Off-Site Containment Areas. U.S. EPA approved the proposal, and new borings were made farther to the east along Colfax.

Soil boring SB149 was advanced approximately 125 feet east of soil boring SB142, along the north side of the proposed final alignment. Soil borings SB150, SB151, and SB152 were advanced at 200 feet (approximate) intervals along the east alignment within the ACS facility boundaries.

### **4.3 OFF-SITE CONTAINMENT AREA**

The proposed barrier wall alignment in the Off-Site Containment Area is relatively unchanged from the alignment presented in the Dewatering/Barrier Wall Alignment Pre-Design Work Plan. Some minor alignment modifications were made based on the soil boring program and results of field and laboratory samples. Because the refuse and void spaces would limit construction of a barrier wall in this area, additional construction activities may be necessary prior to implementation. Twenty-three boring locations were originally planned and staked around the Still Bottom Pond in the Off-Site Area. The borings were spaced 50 feet apart along the southwestern side, adjacent to the Griffith Landfill, and 200 feet apart around the rest of the area. The closer spacing was planned because previous investigations indicated the probable presence of landfill waste along the southwest side of the Off-Site Area.

Refuse and fill material was encountered in soil borings SB201 through SB210, from near the ground surface, to depths of approximately 17 feet below ground surface. This was consistent with information from previous investigations which indicated that refuse has been buried over much of the southern part of the Off-Site Area.

The PCB waste criterion was not exceeded at any of the boring locations. The waste criterion was exceeded at one sample location, SB205, located along the southwest border of the Off-Site Area. The field GC indicated a concentration of 111,639 ppm total VOCs in the 3.5 to 5.5 foot sample interval. In accordance with the approved Scope of Work, a second boring, SB205A, was made outward, approximately 40 feet west of SB205.

The SB205A location was outside the Off-Site Area fence, in the center of the Griffith Landfill perimeter road. The sampling results did not indicate any exceedences of the waste criteria, however, the boring indicated that virtually the entire soil profile consists of buried municipal landfill refuse. Buried refuse was encountered from a depth of approximately 2 feet, to a depth of 17 feet, just three feet above the confining clay layer. Clearly, moving the barrier wall alignment outward into the Griffith Town Landfill is not a viable solution. Nor would moving the alignment to the east, further into the Off-Site Containment Area be viable, since previous investigations indicate buried waste there too.

The most viable location for the final barrier wall alignment will be through the locations of SB201 to SB210. The boring logs show that there are variable thicknesses of refuse along this alignment. But the waste is generally found above the static water table. Refuse and the associated void spaces would limit the constructability of a barrier wall in this area. A possible solution will be to excavate a trench to the base of the refuse along this portion of

the alignment. After removal of the refuse, soils would be brought in to backfill the trench. The proposed final barrier wall would then be constructed through the imported soil. There may be other solutions to the refuse issue, the actual method will be determined in the 100% design.

#### 4.4 REVISED BARRIER WALL ALIGNMENT

After further review of the potential impacts to their process line, American Chemical Service, Inc. (ACS, Inc.) requested a new alignment be developed that goes north of all their active process lines, rather than cut between two of them. The revised alignment extends the barrier wall an additional 200 feet to the north from the proposed final alignment.

Twenty-six new geotechnical borings for were performed by Horizontal Technologies Inc., to confirm the results from the proposed barrier wall alignment and to evaluate the conditions along the revised alignment. The revised alignment was proposed to the U.S. EPA in a letter dated July 30, 1996. The letter contained a map of the proposed alignment and the logs of 26 new test borings. U.S. EPA approved the revised alignment in a letter dated August 12, 1996. Figure 2 shows the revised alignment.

It is possible that some areas of waste will remain outside the barrier wall. To the extent that such areas do exist, they will be addressed by the overall site remedy. #2

## CROSS SECTIONS OF PRELIMINARY FINAL ALIGNMENT

A location map of cross sections through the preliminary final alignment is presented in Figure 3. Figure 4 shows the cross sections through the north alignment (soil borings SB115 through SB151), and the east alignment (soil borings SB151 through SB213). Figure 5 represents the cross section of the west alignment (soil borings SB115 to SB208). Soil boring logs used for cross sections along the preliminary final alignment are presented in Appendix B1. (All other boring logs for the barrier wall alignment investigation are presented in Appendix B3.)

As shown by the cross sections, the geology of the alignment is generally uniform, consisting of fine to coarse sand with some silt and clay overlying a clay confining layer. Soil borings SB151 and SB152, located along Colfax Avenue, contained more sand and gravel than typically observed throughout the site. The depth to clay varied primarily on the basis of ground surface elevation. The clay surface was typically observed to be at an elevation of 617 feet to 622 feet msl. The elevation of the top of clay is consistent with the findings of the Remedial Investigation (RI). The average groundwater elevation of 635 feet above msl along the north (A-A') and east (B-B') cross-section lines, and 634 feet above msl on the west (C-C') cross-section line, is based on groundwater elevation data compiled during the RI from August 17, 1989 to September 13, 1990. The RI data were used to estimate an average water level occurring over a period of time in the late summer and early fall at the site.

The final barrier wall alignment has been revised, moving approximately 200 feet to the north. Additional geotechnical borings were performed by Horizontal Technologies Inc. and the drilling company, Boart Longyear to confirm the results from the Barrier Wall Alignment Technical Memorandum. U.S. EPA approved the revised alignment in a letter dated August 12, 1996.

New  
HP



## ANALYTICAL RESULTS ALONG THE PROPOSED FINAL ALIGNMENT

### 6.1 PCBs

Field and laboratory PCB results for soil samples collected from borings located along the final alignment are summarized on Table 2. Field screening results and proficiency samples are included in Appendix C. Laboratory analytical reports are presented in Appendix E.

Along the proposed barrier wall final alignment in the Still Bottoms/Treatment Lagoon Area (i.e., 100-series borings), 33 soil samples were collected and analyzed for PCBs using the Ohmicron field test kit. PCBs were detected greater than 10 ppm in 10 of the soil samples analyzed with the test kits collected from the following soil borings: SB113, SB143, SB149, SB150, SB151 and SB152. All of the soil samples which exceeded the 10 ppm waste criteria, as well as two samples near the 10 ppm cutoff level (SB124, 8.5 to 10.5 feet, and SB127, 6 to 8 feet) were submitted to IEA Laboratory for confirmatory PCB analysis.

Of the twelve confirmatory soil samples submitted to the laboratory for PCB analysis, only one soil sample exhibited PCB concentrations greater than 10 ppm (Table 2). PCBs were detected in the 6 to 8 foot soil sample collected from soil boring SB127 at 44 ppm, whereas field results for the same sample indicated PCB concentrations at 8.5 ppm.

A total of 34 soil samples from the Off-Site Containment Area portion of the proposed final alignment (200-series borings) were analyzed with the field test kit. Only one sample, SB214 at 13.5 to 15.5 feet, indicated PCBs above the waste criteria (10.6 ppm). This sample was subsequently sent to IEA for confirmatory analysis. The results indicated the presence of PCBs at a concentration of 2.7 ppm, below waste criteria (Table 2).

### 6.2 VOCs

Field and laboratory VOC results for soil samples collected from borings located along the final alignment are summarized on Table 2. Field GC results are included in Appendix D. Laboratory analytical reports from IEA are presented in Appendix E.

A total of 23 soil samples from Still Bottoms/Treatment Lagoon Area portion of the proposed final alignment were analyzed with the field GC (Table 2). The field results

indicated only one soil sample, SB143 6 to 8 feet, had a total VOC concentrations (11,583 ppm) greater than 10,000 ppm waste criteria. A sample from the same split spoon was subsequently submitted to IEA for confirmatory analysis. Results from the lab analysis indicated a total VOC concentration of 0.76 ppm. One other sample from soil boring SB142 (6 to 8 feet) was also submitted for laboratory analysis, although the field-determined VOC concentration was less than criteria set forth in the Dewatering/Barrier Wall Alignment Pre-Design Work Plan (5,168 ppm). Results from this sample indicated a total VOC concentration of 335 ppm.

A total of 35 soil samples from Off-Site Containment Area portion of the proposed final alignment were analyzed with the field GC (Table 2). A soil sample from soil boring SB205 exceeded the 10,000 ppm waste criteria for total VOCs. Confirmation samples were not submitted immediately from this soil boring because of anticipation of moving the barrier wall alignment toward a second boring drilled approximately 40 feet west from this location at SB205A. Upon discovery of landfill refuse at SB205A, the alignment of the barrier wall shifted back to SB205 and the holding time for VOC analysis had elapsed. As discussed in Section 4.3, the area around SB205 will be addressed in the 100% design.

Field GC analyses did not show VOCs greater than 8,000 ppm in any other soil samples from the Off-Site Containment Area; therefore, no soil samples were submitted to the laboratory for confirmation analysis.

## GEOTECHNICAL RESULTS

The geotechnical laboratory results performed on selected soil samples are summarized on Table 3. The laboratory reports are presented in Appendix F.

The granular soils above the clay confining layer are generally classified as a fine to coarse sand with a trace to some silt and clay, and have the Unified Soil Classification System (USCS) symbols of SP, SP-SM, and SM. The clay confining layer is generally classified as clay with a USCS symbol of CL.

According to the rigid-wall falling head permeability testing (U.S. Army Corps of Engineers Method EM 1110-2-1906 (VII)), the permeability of the clay confining layer ranged from  $1.7 \times 10^{-8}$  cm/s (centimeters per second) to  $2.4 \times 10^{-8}$  cm/s based on relatively undisturbed Shelby tube samples. Liquid and plasticity limits ranged from 28-30% and 11-14%, respectively (Table 3).

The results of the flexible-wall hydraulic conductivity/permeability tests (ASTM D5084) for SB109 and SB151 show the permeability of the clay confining layer to be  $2.0 \times 10^{-8}$  cm/sec and  $2.4 \times 10^{-8}$ , respectively. These data are consistent with the permeability values calculated from the falling head method. The result for sample SB212, using the flexible wall method, is two orders of magnitude greater than the result from the falling head method (Table 3). The sample used for the flexible wall method was observed to be more silty than the sample used for the falling head method.

## PILOT TEST CELL BORINGS

In accordance with the expedited Pre-Design Work Plan, sheet piling will be used to construct two small tests cells for conducting pilot studies. One test cell will be constructed in the waste in the Still Bottoms/Treatment Lagoon area on the ACS site, and the other will be constructed in the waste area in the Off-Site Containment Area. Four soil borings were made at each location to evaluate the subsurface conditions and aid in the design of the test cells. Soil borings, SB145 through SB148, were advanced approximately two feet into the clay confining layer in the Still Bottoms/Treatment Lagoon Area and soil borings (SB224 through SB227) were advanced in the Off-Site Containment Area for the pilot test cell locations. The locations of the pilot test cells and borings are presented in Figure 6. Soil boring logs for the Pilot Test Cell borings are presented in Appendix B2.

Based on Standard Penetration Tests (i.e., blow counts), conducted during boring installation (ASTM D1586), the soil materials at both pilot cell locations was classified as loose to medium dense granular soils. Field lithologic logging identified the soils at the Still Bottoms/Treatment Lagoon Area pilot test cell plots as fine to coarse sands with little silt, and generally fine sands and fill material in the Off-Site Containment Area.

Both locations for test cells were selected to be in known waste areas. As expected, some obstructions were encountered during the boring program at both locations. In the Still Bottoms/Treatment Lagoon area, several 1.5 foot thick concrete slabs were encountered one to two feet below the ground surface. As a result of the auger refusal, the borings were moved to the east from the originally planned location. Figure 6 shows the location of the borings that were made to the clay confining layer. In the Off-Site Containment area, several partially-intact metal objects (5 gallon containers and possible drums) were observed in the fill material generally 5 to 8 feet below ground surface.

## SCHEDULE FOR BARRIER WALL CONSTRUCTION

A milestone and deliverable date schedule for barrier wall construction is presented in Table 4. The schedule is based on assumed review times by the U.S. EPA. Concurrent with submittal of this Technical Memorandum to the U.S. EPA, an RFP will be submitted to subcontractors soliciting proposals for barrier wall construction technologies.

Following U.S. EPA approval of the proposed barrier wall alignment, the design of the barrier wall systems will commence. The barrier wall systems include the barrier wall, the groundwater extraction systems, and the performance monitoring system. In addition, the design of the test cells to be used for the SVE and material handling/low temperature thermal desorption pilot tests will be included with the barrier wall systems. A 50 Percent Design and 100 Percent Design will be submitted to U.S. EPA and IDEM for review. As discussed with and approved by the U.S. EPA, the 50 Percent and 100 Percent design documents will meet the requirements for the 30, 60 and 95 Percent design submittals included in the SOW.

The 50 Percent Design document will be submitted once the barrier wall technology and contractor have been selected. That selection is expected to be made on June 19, 1996. The submittal will include the following:

1. A draft of the design basis for all the systems listed above. The design basis will provide a brief description of the design criteria, rationale for major decisions, major equipment, permits/approvals required, effects on groundwater flow patterns, operational procedures, and management of waste and residuals. The design basis will not be complete at this stage since many aspects of the designs will not be resolved or finalized.
2. Barrier Wall Design
  - The performance specification used to solicit contractor bids
  - Drawings showing the final alignment and cross sections
  - A Technical Memorandum presenting the selected barrier wall technology (this will actually be part of the design basis)
3. Extraction System Design
  - A plan drawing showing the layout of the extraction systems
  - A plan drawing showing the conveyance piping
  - Draft details of the extraction wells/trenches

4. Performance Monitoring System Design
  - A draft of the Performance Standard Verification Plan (PSVP)
  - A plan drawing showing the location of the monitoring wells/piezometers
5. Test Cell Design
  - A draft of the specification for the test cells
  - A plan drawings of the test cell
  - A geologic cross-section (if needed)
  - Draft details of the sheet pile construction
6. A draft Health and Safety Plan for the construction
7. A draft Construction Quality Assurance Plan (CQAP)
8. Preliminary Construction Schedule
  - Pre-construction meeting
  - Site preparation and/or workbench construction
  - Start of construction
  - Completion of construction
  - Site restoration

The 100 Percent Design document will incorporate comments on the 50 Percent Design as well as the finalized designs of the various systems and associated plans. Specifically, the submittal will include the following:

1. The final design basis for the various systems
2. Barrier Wall Design
  - The final design drawings
3. Extraction System Design
  - Final drawings of the extraction wells/trenches, sump or wellhead completions, conveyance piping and tie-ins to the treatment system, and electrical power supply and instrumentation.
4. Performance Monitoring System Design
  - Final drawings showing the locations and construction details for the piezometers/monitoring wells.
  - The final PSVP including the sampling program, a QAPP addendum, and a Health and Safety Plan addendum.
5. Test Cell Design
  - Final design drawings for the test cell layout, location, and construction details
  - A performance specification for dewatering the test cell

6. The final Health and Safety Plan
7. The final CQAP
8. Detailed Construction Schedule
  - Pre-construction meeting
  - Site preparation and/or workbench construction
  - Start of construction
  - Completion of construction
  - Site restoration

The final design of the barrier wall will incorporate all known underground and overhead utilities, pipelines, sewers and drains in the area. Figure 7 shows the final alignment of the wall and all known potentially affected utilities in the vicinity of the ACS facility. Based on deliverable dates established on a milestone basis, the construction of the barrier wall will be completed by February 28, 1997 (Table 4).

*Revised*

J:\4077\TECHMEMO\BAR-WALL\BW-TM-2.DOC



ORGANICS  
DATA VALIDATION NARRATIVE

Site Name ACS Project # 4077.0076  
 SMO Case # (SAS #) 1589-126 #Samples/Matrix 3/soil  
 Laboratory IEA-NC Hours for Review \_\_\_\_\_  
 SOW # OLM01.9 1/91 w/ew EPA Validation Guidelines # REGION II  
 Sample Numbers ACS-SB110 7-9, ACS-SB118 6-8, & ACS-SB119 6-8  
 Validated By [Signature] Date 3/29/96  
 Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

SUMMARY OF REVIEW: VOLATILES  
(SOILS)

HOLDING TIMES - SAMPLE ACS-SB110-SS4 7-9' ANALYZED WITH-IN HOLDING TIMES. SAMPLES ACS-SB119-SS3 6-8' AND ACS-SB118-SS3 6-8' WERE ANALYZED 17 DAYS AFTER SAMPLE COLLECTION. THESE SAMPLES DID MEET THE MAXIMUM HOLDING TIME FOR ANALYSIS, 10 DAYS AFTER THE VERIFIED TIME OF SAMPLE RECEIPT. DUE TO THE EXTREMELY HIGH CONCENTRATION OF TARGET COMPOUNDS, THESE SAMPLES WILL NOT BE QUALIFIED FOR BEING ANALYZED OUTSIDE OF HOLDING TIMES.

GC/MS INSTRUMENT PERFORMANCE CHECK -

- ALL CRITERIA MET FOR INSTRUMENT #MS05

INITIAL AND CONTINUING CALIBRATION -

INITIAL - #MS05 12/20/95 20:41 → 23:26: ALL CRITERIA MET

CONTINUING - #MS05 1/30/96 17:27: 1,2,4-CA 7.0 D AT 28.9%, - ALL OTHER CRITERIA MET  
 #MS05 02/10/96 15:15: 1,2,4-CA 7.0 D AT 25.7% - ALL OTHER CRITERIA MET

BLANK ANALYSIS - NO TARGET COMPOUND DETECTS IN BLANKS ASSOCIATED W/ THESE SAMPLES - TICs DETECTED IN BLANK VIALS 54.

SYSTEM MONITORING COMPOUND RECOVERIES - REPORTING FORM INDICATES SYSTEM MONITORING COMPOUNDS WERE FILLED OUT (P). RECOVERIES WERE ALSO REPORTED. THESE RECOVERIES WERE WITHIN RE LIMITS. IT IS UNCLEAR WHETHER SURROGATE SPIKING OCCURRED AFTER SAMPLE EXTRACTION.

MATRIX SPIKE / MATRIX SPIKE DUPLICATE - TCE AND TOLUENE DETECTED IN SAMPLE ACS-SB118 6-8' AT LEVELS MUCH ABOVE SPIKING LEVELS. ALL OTHER SPIKING COMPOUNDS DILUTED OUT.

- DUE TO HIGH SAMPLE TARGET COMPOUND CONCENTRATIONS, MS/MSD DATA NOT APPLICABLE.

FIELD DUPLICATES - NO FIELD DUPLICATES INCLUDED IN THIS SDG

INTERNAL STANDARD PERFORMANCE - ALL REQUIRED CRITERIA MET

TCL COMPOUND IDENTIFICATION - SOME COMPOUNDS OUTSIDE LIMITS OF 10.06 PART IF THIS STANDARD - MASS SPECTRA CRITERIA MET - NO QUALIFIERS

COMPOUND QUANTIFICATION AND REPORTED DETECTION LIMITS -

QUANTIFICATION - ACCEPTABLE ACCORDING TO MEDIUM / HIGH METHADILLOGY

DETECTION LIMITS - PROPERLY ADJUSTED FOR % MISTAKE IF SOIL AND DILUTION FACTORS APPLIED TO SAME.



March 7, 1996

Peter Vagt  
Montgomery-Watson  
One Science Court  
Madison, WI 53711

IEA Project No.:	1589126D/9601511
IEA Reference No.:	W9601554
Client Project I.D.:	4077.0075

Dear Mr. Vagt:

Please find enclosed the results of analyses on twelve samples submitted to our laboratory.

The sample(s) were received intact unless otherwise noted on the Chain of Custody record.

Analyses were performed according to approved methodologies and meet the requirements of the IEA Quality Assurance Program except were noted. Please see the enclosed reports for your results and a copy of the Chain of Custody documentation.

Thank you for selecting IEA for your sample analysis. Please do not hesitate to call your project manager should you have any questions regarding this report. Please feel free to use our toll free number, 1-800-444-9919. We look forward to serving you in the future.

Very truly yours,

IEA, Inc



for William S. Scott  
Project Manager

IEA

SDG NARRATIVE VOLATILE FRACTION

PROJECT: 1589-126

BATCH: 01511

METHOD: 1/91 SOW

SAMPLES: Three (3) Soil Samples

These samples were received at Industrial and Environmental Analysts, Inc. (IEA) on January 25 and February 01, 1996. Each sample was assigned a 9-character "IEA" lab identification number (lab ID) and an abbreviated client ID for simplicity in forms generation. This package makes reference to these ID's as listed on the IEA Assigned Number Index. In addition the pH for the water samples are listed on this index. All analyses were performed according to the EPA 1/91 SOW and meet the requirements of the IEA Quality Assurance Program. Please see the enclosed data package for your results and Chain of Custody (COC) documentation.

There is an air peak that is common to all of the volatile analyses and a solvent peak that is common to some volatile analyses. These peaks are present at the beginning of the Reconstructed Ion Chromatograms (RIC) and are labeled. These peaks are not searched as Tentatively Identified Compounds (TIC's).

The chromatographic separation of the analytes is performed using a J & W Scientific 75 m X 0.53 mm DB-624 fused silica capillary column with a 3.0  $\mu$ m film thickness.

The trap used in the purge-and-trap apparatus is a Supelco trap K (VOCARB 3000) consisting of 10 cm of Carboxen B, 6 cm of Carboxen 1000, and 1 cm of Carboxen 1001. This trap meets the criteria in the SOW for contract OLM03.1 for an equivalent trap. Documentation is maintained within the QA department for on-site review.

The "J" flag used on the Form I VOA indicates an estimated concentration between the Contract Required Quantitation Limit (CRQL) and the Method Detection Limit (MDL), not accounting for dilution of the sample prior to analysis. This flag is also used on the Form I VOA-TIC to indicate an estimated amount for all non-target concentrations.

The "M" flag used on the data system report form designates that a manual integration was required to provide an accurate quantification of that analyte. Manual integrations have been initialled and dated by the analyst.

The "Y" flag is used as a qualifier on the Form I VOA-TIC to indicate a siloxane contaminant attributed to trap breakdown.

The "N" flag used on the Form I VOA-TIC indicates that there is the presumptive evidence of a compound based on the mass spectral library search and the interpretation of the mass spectral interpretation specialist.

The "D" flag is used on the surrogate and spike recoveries to designate they were diluted out.

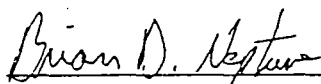
IEA

SDG NARRATIVE VOLATILE FRACTION

The following nonconformances associated with the analysis of the samples in this case are as follows:

Sample number 04 (client ID ACS-SB118SS3-6'-8') was used for the medium level soil matrix spike/matrix spike duplicate (MS/MSD). Due to the high dilution factor most of the spike compounds did not recover. This is designated with the "D" flag on the percent recoveries.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his designee, as verified by the following signature.



03/05/96

Brian D. Neptune  
Lead Analyst, GC/MS Final Review  
IEA, Inc.

IEA Assigned Number Index

Case No.: 1589-126

SDG No.: 01511

IEA Lab Sample Number	Sample Number	Abbreviated Sample Number
9601511-01	ACS-SB110SS4-7'-9'	OSS479
9601511-02	ACS-SB112SS5-9'-11'	SS5911
9601511-03	ACS-SB113SS4-7'-9'	3SS479
9601511-21	HB01511	HB
9602124-04	ACS-SB118SS3-6'-8'	8SS368
9602124-05	ACS-SB119SS3-6'-8'	9SS368
9602124-06	ACS-SB124SS4-8.5'-10.5'	485105
9602124-07	ACS-SB127SS3-6'-8'	7SS368
9602124-08	ACS-SB128SS3-6'-8'	8SS368
9602124-09	ACS-SB129SS5-11'-13'	S51113
9602124-10	ACS-SB214SS6-13.5'-15.5'	135155
9602124-11	ACS-SB128SS3-6'-8' DUP	SS368D

Review Date:

Reviewed by:

Review of Contract Data; SMO Case No. 1589-126

Site Name: ACS

Contract Lab: IEA-NC

Contract No.: \_\_\_\_\_

Project No.: 4077.0076

SMO Traffic No's: \_\_\_\_\_

Sample Matrix: Low Level \_\_\_\_\_

Med. Level X

High Level \_\_\_\_\_

Soil/Seq X

Water \_\_\_\_\_

Waste \_\_\_\_\_

## I. HOLDING TIMES

Water: VOA SV PEST  
Sed/Soil: VOA P SV NA PEST NA

A - Acceptable - All contract and 40 CFR 136 holding times met.

P - Provisional - Some contract and 40 CFR 136 holding times exceeded.

U - Unacceptable - All holding times exceeded.

### VOLATILES

#### REMARKS:

- SAMPLE ACS-SB110-SS4 7-9' ANALYZED WITH-IN HOLDING TIMES. SAMPLES ACS-SB119-SS36 AND ACS-SB118-SS3 6-8' WERE ANALYZED 17 DAYS AFTER SAMPLE COLLECTION. THESE SAMPLES DID NOT MEET MAXIMUM METHOD HOLDTIME FOR ANALYSIS OF 14 DAYS AFTER THE VERIFIED TIME OF SAMPLE ACCEIPT. DUE TO THE HIGH LEVEL OF TARGET COMPOUNDS IN THESE SAMPLES, DATA WILL NOT BE QUALIFIED FOR BEING ANALYZED OUTSIDE OF HOLDING TIMES.

## II. GC/MS TUNING AND PERFORMANCE

(GC/MS INSTRUMENT PERFORMANCE CHECK) -

Water: VOA (BFB) SV (OFTPP)  
Sed/Soil: VOA (BFB) A SV (OFTPP) NA

A - Acceptable - All criteria met, spectra of good quality.

P - Provisional - All criteria not met, spectra of reasonable quality; date usable.

U - Unacceptable - Criteria not met, spectra of poor quality, data unusable.

VOLATILES - INITIAL #MS05 BFB 12/20/95 19:20

BFB 01/30/96 16:50 54.36min

BFB 02/10/96 14:33 94.33min

MO Case No.: 1589-126

Contract Lab: IEA-NC

### III. INITIAL AND CONTINUING CALIBRATION CHECKS

Water: VOA P SV SV PEST PEST  
 Sed/Soil: VOA P SV NA PEST NA

- A - Acceptable - All criteria met.  
 P - Provisional - Some criteria not met, data usable, see remarks.  
 U - Unacceptable - Criteria not met, data unusable, see remarks.

#### REMARKS: VOLATILES:

INITIAL: INSTRUMENT #MS05 12/20/96 21:41-25:26; ALL CRITERIA MET  
CONTINUING: #MS05 01/30/96 17:27; 1,2-DCA  $\%D @ 28.9\%$  NOTE: ACETONE  $\%D @ 29.9\%$ ,  
 2-Butanone  $\%D @ 41.8\%$ , 4-Methyl-2-Pentanone  $\%D @ 34.7\%$  AND 2-HEXANONE  
 $\%D @ 38.2\%$   
 #MS05 02/10/96 15:15; 1,2-DCA  $\%D @ 25.7\%$  NOTE: 4-Methyl-2-Pentanone  $\%D @ 26\%$   
 SURROGATE 1,2-DCA  $d_4 \%D @ 32\%$

### IV. BLANK ANALYSIS

Water: VOA P SV SV PEST PEST  
 Sed/Soil: VOA P SV NA PEST NA

- A - Acceptable - No contaminants above minimum detection limit, no interference with sample results, appropriate blank for each GC/MS system and extraction method.  
 P - Provisional - Contaminants present but minimal interference with sample results.  
 U - Unacceptable - Gross contamination, too much interference to use data for certain components or the entire fraction, appropriate blanks not analyzed.

VOLATILES: - VBCK54 - NO TARGET COMPOUND DETECTS; DL's @ 1200

TICS DETECTED: TRICHLORO BENZENE ISOMER 28.54  
 DIMETHYL NAPHTHALENE ISOMER 32.74

VBCK5M - NO TARGET COMPOUND DETECTS; DL's @ 1200  
 NO TICS DETECTED

40 Case No.: 1589-126

Contract Lab: IEA-NC

# SURROGATE SPIKE RESULTS

Water: VOA SV PEST  
Sed/Soil: VOA A SV NA PEST NA

NOTE: Sample data flagged on individual basis.

## Individual sample flagging criteria.

- Acceptable - All surrogate recoveries within criteria.  
Suspect - Any surrogate recoveries outside criteria and/or recoveries of <10% substantiated as a matrix effect.  
Invalid - Any recoveries of <10% that are unsubstantiated as a matrix effect.

No. Samples      No. Suspect      No. Invalid

<del>Water:</del>	<del>VOA</del>	<del>_____</del>	<del>_____</del>	<del>_____</del>
	<del>SV</del>	<del>_____</del>	<del>_____</del>	<del>_____</del>
	<del>PEST</del>	<del>_____</del>	<del>_____</del>	<del>_____</del>
Sed/Soil:	VOA	<u>3</u>	<u>0</u>	<u>0</u>
	SV	_____	_____	_____
	PEST	_____	_____	_____

## 3. Summary of Surrogates

- A - Acceptable - <10% of samples reported as suspect.  
P - Provisional - >10% but <50% of samples reported as suspect.  
U - Unacceptable - >50% of samples reported as suspect and/or >10% samples reported as invalid.

## REMARKS:

VOLATILES - REPORTING FORM INDICATES SYSTEM MONITORING COMPOUNDS WERE DILUTED OUT (D). RECOVERIES WERE ALSO REPORTED. THESE RECOVERIES WERE WITHIN U.C. LIMITS. IT IS UNCLEAR WHETHER SURROGATE SPIKING OCCURRED AFTER SAMPLE EXTRACTION

MO Case No.: 1589-126Contract Lab: IEA-NC

## I. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

## A. MATRIX SPIKE RESULTS:

~~Water: VOA NA SV NA PEST NA~~  
~~Sed/Soil: VOA NA SV NA PEST NA~~

NOTE: No action taken on Matrix Spike Results alone.

- A - Acceptable - <10% of compounds outside criteria.  
P - Provisional - >10% but <50% of compounds outside criteria.  
U - Unacceptable - >50% of compounds outside criteria and/or >10% of compounds with recoveries of <10%.

	No. Compounds	No. Outside Criteria	No. <10% Recovery
--	---------------	----------------------	-------------------

<del>Water:</del>	<del>VOA</del>	<del></del>	<del></del>
	<del>SV</del>	<del></del>	<del></del>
	<del>PEST</del>	<del></del>	<del></del>
Sed/Soil:	VOA	5	3
	SV		
	PEST		

## B. DUPLICATE RESULTS

~~Water: VOA NA SV NA PEST NA~~  
~~Sed/Soil: VOA NA SV NA PEST NA~~

- A - Acceptable - <10% of compounds outside criteria.  
P - Provisional - >10% but <50% of compounds outside criteria.  
U - Unacceptable - >50% of compounds outside criteria and/or >10% of compounds with recoveries of <10%.

	No. Compounds	No. Outside Criteria
--	---------------	----------------------

<del>Water:</del>	<del>VOA</del>	<del></del>
	<del>SV</del>	<del></del>
	<del>PEST</del>	<del></del>
Sed/Soil:	VOA	5
	SV	
	PEST	

## REMARKS:

VOLATILES: SAMPLE ACS-SB118 6-8 USED FOR MS/MSD. TOLUENE AND TRICHLOROETHYLENE DETECTED AT LEVELS GREATER THAN SPIKING LEVELS. SOIL HETEROGENEITY HAS AFFECTED % RECOVERIES FOR THESE COMPOUNDS. OTHER SPIKING COMPOUNDS WERE OBLITERATED OUT.

[V-SOP-99]

- DUE TO HIGH SAMPLE TARGET COMPOUND CONCENTRATIONS, MS/MSD DATA NOT APPLICABLE



SMO Case No.: 1589-126

Contract Lab: IEA-NC

### III. FIELD DUPLICATES

Water: VOA NA SV NA PEST NA  
Sed/Soil: VOA NA SV NA PEST NA

A - Acceptable - All compounds are within 25% of each other for waters or within 50% of each other for soils.

P - Provisional - Some compounds are greater than 25% RPD for waters and greater than 50% RPD for soils, see remarks.

U - Unacceptable - Professional judgement, see remarks.

## REMARKS:

[illegible]

40 Case No.: 1589-126

Contract Lab: IEA-NC

### III. INTERNAL STANDARD PERFORMANCE

~~Water:~~ VOA SV PEST  
Sed/Soil: VOA A SV NA PEST NA

- A - Acceptable - Is area counts between - 50% to +100% from associated calibration standard and  $\pm 30$  seconds from associated calibration standards.
- P - Provisional - Most all area counts between -50% to +100% and  $\pm 30$  seconds, from associated calibration standard, see remarks.
- U - Unacceptable - Extremely low area counts or major abrupt drop-off of sensitivity or greater than  $\pm 30$  second time shift, see remarks.

REMARKS: Volatiles: All required criteria met

### IX. COMPOUND IDENTIFICATION

~~Water:~~ VOA P SV PEST  
Sed/Soil: VOA P SV NA PEST NA

- A - Acceptable - All compounds within retention time windows, spectral criteria met.
- P - Provisional - Some criteria not met, data usable, see remarks.
- U - Unacceptable - Criteria not met, data unusable, see remarks.

REMARKS:

Volatiles: Some RT of sample compounds outside limits of ID. 0.6 RT of standards, mass spectra criteria met; No qualifiers.

MO Case No.: 1989-126Contract Lab: IEA-NC

## COMPOUND QUANTIFICATION AND REPORTED D.L.

Water:	VOA	<u>A</u>	SV	<u>NA</u>	PEST	<u>NA</u>
Sed/Soil:	VOA	<u>A</u>	SV	<u>NA</u>	PEST	<u>NA</u>

- A - Acceptable - Compounds were quantified, as well as the adjustment of the CRQL, was calculated according for the SOW or SAS.
- P - Provisional - Some criteria not met, data usable, see remarks.
- U - Unacceptable - Gross problems, interferences, unacceptable RT and RRF shifts, see remarks.

## REMARKS:

VOLATILES:QUANTIFICATION - ACCEPTABLE ACCORDING TO MED/HALL METHODOLOGYREPORTED DETECTION LIMITS - PROPERLY ADJUSTED FOR DETECTION LIMIT AND TRANSMITTANCE OF SOIL SAMPLE

## XI. SYSTEM PERFORMANCE

Water:	VOA	<u>A</u>	SV	<u>NA</u>	PEST	<u>NA</u>
Sed/Soil:	VOA	<u>A</u>	SV	<u>NA</u>	PEST	<u>NA</u>

- A - Acceptable - No indication of instrument problems such as baseline shifts, I.S. absolute area changes, etc.
- P - Provisional - Indication of minor problems, see remarks.
- U - Unacceptable - Indication of instrument problems, see remarks.

## REMARKS:

VOLATILES:

• SAMPLE ACS-SB110 7-9' WITH DIMETHYL NAPHTHALENE ISOMER (DMC) QUANTIFIED AS NON-DETECT DUE TO ITS DETECTION IN A BLANK ASSOCIATED WITH THESE SAMPLES.

• SAMPLES ACS-SB119-SS3 6-8' AND ACS-SB118-SS3 6-8' WERE ANALYZED 17 DAYS AFTER SAMPLE COLLECTION. THESE SAMPLES DID MEET THE MAXIMUM METHOD HOLDTIME FOR ANALYSIS; 10 DAYS AFTER THE VERIFIED TIME OF SAMPLE RECEIPT. DUE TO THE EXTREMELY HIGH CONCENTRATION OF TEL COMPOUNDS, THE SAMPLES <sup>WERE</sup> NOT QUANTIFIED FOR BEING ANALYZED OUTSIDE OF HOLDING TIMES.

Case # 1589-126

ACS 4077.0076

Three soil samples were analyzed for GC/MS volatiles

by NED/High Methodology. Sample ACS-58110 7-9, was

analyzed within 10 days of the sample collection.

ACS-58119 6-8, was analyzed 17 days after sample collection.

These samples did meet the maximum method holdtime for

analysis of 10 days after the verified time of sample receipt.

Samples were not analyzed for analysis outside of the advisory

holdtime of 19 days for soils. Instrument performance criteria were met for

initial and continuing calibration data were acceptable

with the exception of the compound 1,2-dichlorobenzene

which was outside the  $\pm 25\%$  criteria in continuing calibrations.

This compound was not detected in these samples therefore,

data was not analyzed.

Report form for system non-ideal compound recoveries

indicates the compounds were diluted out. The form also

indicates recovery values within O.C. limits. It is unclear

whether surrogate spikes occurred after sample extraction. Matrix

spike compounds were diluted out.

Sample ACS-58110 7-9, tentatively identified compound identical

Northridge Isomer, analyzed as non-ideal. This compound was

detected in a method blank associated with these samples.

Some compound relative retention times were outside the  $\pm 0.06$

minute limit from associated standards. Mass spectra criteria

was met therefore, no data was generated.

Detection limits reported were properly adjusted for percent

moisture of soil samples and dilution factors applied to these

samples. Distribution of TLE compounds was acceptable.

No other constituents applied to these samples.

Mark J. J. J.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION V  
CALIBRATION OUTLIERS  
VOLATILE HSL COMPOUNDS

CASE/SAS # 1589-126

CONTRACTOR IEA-NC

	#MSD5	#MSD5	#MSD5	#MSD5	#MSD5
Instrument #	Init. Cal.	Cont. Cal.	Cont. Cal.	Cont. Cal.	Cont. Cal.
DATE/TIME:	12/20/95 20:41:23.26	01/30/96 17:27	12/10/96 15:15		
	RF 12RSD	RF 120	RF 120	RF 120	RF 120
Chloromethane					
Bromomethane					
Vinyl Chloride					
Chloroethane					
Methylene Chloride					
Acetone					
Carbon Disulfide					
1,1-Dichloroethane					
1,1-Dichloroethene					
Trans-1,2-Dichloroethane					
Chloroform					
2-Butanone					
1,2-Dichloroethane		1.519 128.9	1.587 125.7		
1,1,1-Trichloroethane					
Carbon Tetrachloride					
Vinyl Acetate					
Bromodichloromethane					
1,2-Dichloropropane					
Trans-1,3-Dichloropropene					
Trichloroethene					
Dibromochloromethane					
1,1,2-Trichloroethane					
Benzene					
cis-1,3-Dichloropropene					
2-Chloroethylvinylether					
Bromoform					
4-Methyl-2-Pentanone					
2-Hexanone					
Tetrachloroethene					
1,1,2,2-Tetrachloroethane					
Toluene					
Chlorobenzene					
Ethylbenzene					
Styrene					
m-Xylene					
o/p-Xylene					
AFFECTED SAMPLES:  Reviewer's Initials/Date:	INITIAL CAL.	VSTD050 SL	VSTD050 5A		
	VSTD010 5A	VBLK5M	VBLK54		
	VSTD200 5A	ACS-SB110 7-9	ACS-SB110 6-8		
	VSTD100 5A		ACS-SB118 6-7 MS		
	VSTD050 5A		ACS-SB118 6-8 MSD		
	VSTD020 5A		ACS-SB119 6-8		

\* These flags should be applied to the analytes on the sample data sheets.

NOTE: DETECTIONS QUANTITATED BELOW THE REPORTED DETECTION LIMITS  
WERE QUANTIFIED AS (J) ESTIMATED CONCENTRATIONS.

VALIDATED

ACS-SB110-SS4 7-9'

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

Lab Name: IEA-NC

Method: SOW 1/91

ACS-SB110SS4-7'-9'

Lab Code: IEA

Case No.: 1589-126

DATE SAMPLED = 1/22/96

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960151101

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0130E07.D

Level: (low/med) MED

Date Received: 01/25/96 (3)

% Moisture: not dec. 15

Date Analyzed: 01/30/96 (3)

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 400.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CARL MULTIPLEX = 466.67

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/kg Q

74-87-3	Chloromethane	560000	U
74-83-9	Bromomethane	560000	U
75-01-4	Vinyl Chloride	560000	U
75-00-3	Chloroethane	560000	U
75-09-2	Methylene Chloride	560000	U
67-64-1	Acetone	560000	U
75-15-0	Carbon Disulfide	560000	U
75-35-4	1,1-Dichloroethene	560000	U
75-34-3	1,1-Dichloroethane	560000	U
540-59-0	1,2-Dichloroethene (total)	J 240000	J
67-66-3	Chloroform	560000	U
107-06-2	1,2-Dichloroethane	560000	U
78-93-3	2-Butanone	560000	U
71-55-6	1,1,1-Trichloroethane	2200000	
56-23-5	Carbon Tetrachloride	560000	U
75-27-4	Bromodichloromethane	560000	U
78-87-5	1,2-Dichloropropane	560000	U
10061-01-5	cis-1,3-Dichloropropene	560000	U
79-01-6	Trichloroethene	2800000	
124-48-1	Dibromochloromethane	560000	U
79-00-5	1,1,2-Trichloroethane	560000	U
71-43-2	Benzene	J 150000	J
10061-02-6	Trans-1,3-Dichloropropene	560000	U
75-25-2	Bromoform	560000	U
108-10-1	4-Methyl-2-Pentanone	560000	U
591-78-6	2-Hexanone	560000	U
127-18-4	Tetrachloroethene	8300000	
108-88-3	Toluene	2600000	
79-34-5	1,1,2,2-Tetrachloroethane	560000	U
108-90-7	Chlorobenzene	560000	U
100-41-4	Ethylbenzene	930000	
100-42-5	Styrene	560000	U
1330-20-7	Xylene (total)	4600000	





## VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: IEA-NC

Method: SOW 1/91

ACS-SB119SS3-6'-8'

Lab Code: IEA

Case No.: 1589-126

DATE SAMPLED = 1/25/96

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212405

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0210E12.D

Level: (low/med) MED

Date Received: 02/01/96 (7)

% Moisture: not dec. 12

Date Analyzed: 02/11/96 (17)

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 100.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CRQL MULTIPLIER = 116.66

### CONCENTRATION UNITS:

CAS NO.      COMPOUND      (ug/L or ug/Kg)      ug/kg      Q

74-87-3	Chloromethane	140000	U
74-83-9	Bromomethane	140000	U
75-01-4	Vinyl Chloride	140000	U
75-00-3	Chloroethane	140000	U
75-09-2	Methylene Chloride	140000	U
67-64-1	Acetone	140000	U
75-15-0	Carbon Disulfide	140000	U
75-35-4	1,1-Dichloroethene	140000	U
75-34-3	1,1-Dichloroethane	140000	U
540-59-0	1,2-Dichloroethene (total)	J 47000	J
67-66-3	Chloroform	140000	U
107-06-2	1,2-Dichloroethane	140000	U
78-93-3	2-Butanone	140000	U
71-55-6	1,1,1-Trichloroethane	140000	U
56-23-5	Carbon Tetrachloride	140000	U
75-27-4	Bromodichloromethane	140000	U
78-87-5	1,2-Dichloropropane	140000	U
10061-01-5	cis-1,3-Dichloropropene	140000	U
79-01-6	Trichloroethene	140000	U
124-48-1	Dibromochloromethane	140000	U
79-00-5	1,1,2-Trichloroethane	140000	U
71-43-2	Benzene	J 41000	J
10061-02-6	Trans-1,3-Dichloropropene	140000	U
75-25-2	Bromoform	140000	U
108-10-1	4-Methyl-2-Pentanone	140000	U
591-78-6	2-Hexanone	140000	U
127-18-4	Tetrachloroethene	J 50000	J
108-88-3	Toluene	1600000	
79-34-5	1,1,2,2-Tetrachloroethane	140000	U
108-90-7	Chlorobenzene	140000	U
100-41-4	Ethylbenzene	590000	
100-42-5	Styrene	140000	U
1330-20-7	Xylene (total)	3000000	

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

Method: SOW 1/91

SDG No.: 01511

Lab Sample ID: 960212405

Lab File ID: 0210E12.D

Date Received: 02/01/96

Date Analyzed: 02/11/96

Dilution Factor: 100.0

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/kg

[illegible]

## VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: IEA-NC

Method: SOW 1/91

ACS-SB118SS3-6'-8'

Lab Code: IEA

Case No.: 1589-126

DATE SAMPLED = 1/24/96

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212404

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0210E07.D

Level: (low/med) MED

Date Received: 02/01/96 (8)

% Moisture: not dec. 13

Date Analyzed: 02/10/96 (17)

GC Column: DB-624 ID: .53 (mm)

Dilution Factor: 200.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CRQL MULTIPLIER = 233.33

## CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) ug/kg Q

74-87-3	Chloromethane	280000	U
74-83-9	Bromomethane	280000	U
75-01-4	Vinyl Chloride	280000	U
75-00-3	Chloroethane	280000	U
75-09-2	Methylene Chloride	280000	U
67-64-1	Acetone	230000	J
75-15-0	Carbon Disulfide	280000	U
75-35-4	1,1-Dichloroethene	280000	U
75-34-3	1,1-Dichloroethane	280000	U
540-59-0	1,2-Dichloroethene (total)	280000	U
67-66-3	Chloroform	280000	U
107-06-2	1,2-Dichloroethane	280000	U
78-93-3	2-Butanone	280000	U
71-55-6	1,1,1-Trichloroethane	280000	U
56-23-5	Carbon Tetrachloride	280000	U
75-27-4	Bromodichloromethane	280000	U
78-87-5	1,2-Dichloropropane	280000	U
10061-01-5	cis-1,3-Dichloropropene	280000	U
79-01-6	Trichloroethene	80000	J
124-48-1	Dibromochloromethane	280000	U
79-00-5	1,1,2-Trichloroethane	280000	U
71-43-2	Benzene	280000	U
10061-02-6	Trans-1,3-Dichloropropene	280000	U
75-25-2	Bromoform	280000	U
108-10-1	4-Methyl-2-Pentanone	280000	U
591-78-6	2-Hexanone	280000	U
127-18-4	Tetrachloroethene	360000	
108-88-3	Toluene	3800000	
79-34-5	1,1,2,2-Tetrachloroethane	280000	U
108-90-7	Chlorobenzene	280000	U
100-41-4	Ethylbenzene	1000000	
100-42-5	Styrene	280000	U
1330-20-7	Xylene (total)	4500000	

# VALIDATED

1E  
VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACS-SB118SS3-6'-8'

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212404

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0210E07.D

Level: (low/med) MED

Date Received: 02/01/96

% Moisture: not dec. 13

Date Analyzed: 02/10/96

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 200.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

Number TICs Found: 11

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
000111-65-9	OCTANE	16.02	JN 160000	JN
	Substituted Benzene	22.28	340000	J
	Unknown Alkane	22.54	380000	J
	Trimethyl Benzene Isomer	23.36	410000	J
000128-37-0	BUTYLATED HYDROXYTOLUENE	25.80	770000	JNY
	Substituted Benzene	26.63	340000	J
	Substituted Benzene	27.09	480000	J
	Substituted Naphthalene	27.35	410000	J
	Substituted Naphthalene	27.56	250000	J
000091-20-3	NAPHTHALENE	28.11	530000	JN
	2,3-Dihydro dimethyl 1H-Indene	28.78	↓ 270000	J
	ISOMER			
	TOTAL SUBSTITUTED BENZENE		JN 1,160,000 J	
	TOTAL SUBSTITUTED NAPHTHALENE		JN 460,000 J	
	2,3-DIHYDRO DIMETHYL 1H-INDENE ISOMER			



ORGANICS  
DATA VALIDATION NARRATIVE

Site Name ACS Project # 4077.0076  
 SMO Case # (SAS #) 1589-126 #Samples/Matrix 8 / SOIL  
 Laboratory IEA-CT Hours for Review \_\_\_\_\_  
 SOW # 1191 EPA Validation Guidelines # REGION V  
 Sample Numbers 9601511-02 → 03, 9602124-06 → 11  
 Validated By [Signature] Date 3/22/96  
 Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

## SUMMARY OF REVIEW:

PCBs  
(SOIL)

I. HOLDING TIMES - ALL SOIL SAMPLES WERE EXTRACTED WITHIN THE RECOMMENDED HOLDING TIME OF 14 DAYS. SUBSEQUENTLY, ALL EXTRACTS WERE ANALYZED WITHIN 40 DAYS OF SAMPLE EXTRACTION.

II. PCB INSTRUMENT PERFORMANCE

- PCB DATA ACCEPTABLE

III. CALIBRATION

INITIAL - Instrument # HP5890 P1 02/15/96 ALL AROCLORS @ 0.1 ng EXCEPT 1221 @ 0.2 ng  
 Instrument # HP5890 P2 02/02/96  
 Instrument # HP5890 P4 02/22/96 → 02/22/96

CONTINUING - AROCLOR SEQUENCE RUN AT THE OF EACH RUN.



IV. BLANKS - PBCK82 02/10/96 HP5890 P2 PB1701  
 02/15/96 HP5890 P1 RTX35

PBCK92 02/16/96 HP5890 P1 RTX35  
 02/17/96 HP5890 P2 PB1701

- BLANKS ACCEPTABLE

V. SURROGATE ALLOWANCES - ALL SAMPLES WITH SURROGATES DILUTED OUT DUE TO HIGH PCB CONCENTRATIONS WITH THE EXCEPTION OF SAMPLE 55113.

VI. MATRIX SPIKE / MATRIX SPIKE DUPLICATES - TWO MS/MSD<sub>6</sub> ANALYZED 1) 55113  
 2) 555911

- ALL MATRIX SPIKING COMPOUNDS DILUTED OUT. AROCLOR 1260 USED FOR SPIKING PURPOSES.

VII. FIELD DUPLICATES - 1 SET INCLUDED IN THIS SDG. RPD'S FOR AROCLORS 1260 & 1260 > 51% BUT LESS THAN 81%. ACCEPTABLE FOR HIGH CONCENTRATIONS OF AROCLORS PRESENT IN SAMPLE AND DUPLICATE.

VIII. COMPOUND IDENTIFICATION - PCBs IDENTIFIED BY PATTERN RECOGNITION - COMPARISON TO KNOWN STANDARDS

IX. COMPOUND QUANTIFICATION AND REPORTED DETECTION LIMITS -

- QUANTIFICATION USING PEAKS - ACCEPTABLE

- REPORTED DETECTION LIMITS - PROPERLY ADJUSTED FOR DILUTION FACTOR AND SOIL PERCENT

X. SYSTEM PERFORMANCE - PCB DATA QUALITY ACCEPTABLE

MOISTURE

IEA

SDG NARRATIVE VOLATILE FRACTION

PROJECT: 1589-126

BATCH: 01511

METHOD: 1/91 SOW

SAMPLES: Three (3) Soil Samples

These samples were received at Industrial and Environmental Analysts, Inc. (IEA) on January 25 and February 01, 1996. Each sample was assigned a 9-character "IEA" lab identification number (lab ID) and an abbreviated client ID for simplicity in forms generation. This package makes reference to these ID's as listed on the IEA Assigned Number Index. In addition the pH for the water samples are listed on this index. All analyses were performed according to the EPA 1/91 SOW and meet the requirements of the IEA Quality Assurance Program. Please see the enclosed data package for your results and Chain of Custody (COC) documentation.

There is an air peak that is common to all of the volatile analyses and a solvent peak that is common to some volatile analyses. These peaks are present at the beginning of the Reconstructed Ion Chromatograms (RIC) and are labeled. These peaks are not searched as Tentatively Identified Compounds (TIC's).

The chromatographic separation of the analytes is performed using a J & W Scientific 75 m X 0.53 mm DB-624 fused silica capillary column with a 3.0  $\mu$ m film thickness.

The trap used in the purge-and-trap apparatus is a Supelco trap K (VOCARB 3000) consisting of 10 cm of Carboxen B, 6 cm of Carboxen 1000, and 1 cm of Carboxen 1001. This trap meets the criteria in the SOW for contract OLM03.1 for an equivalent trap. Documentation is maintained within the QA department for on-site review.

The "J" flag used on the Form I VOA indicates an estimated concentration between the Contract Required Quantitation Limit (CRQL) and the Method Detection Limit (MDL), not accounting for dilution of the sample prior to analysis. This flag is also used on the Form I VOA-TIC to indicate an estimated amount for all non-target concentrations.

The "M" flag used on the data system report form designates that a manual integration was required to provide an accurate quantification of that analyte. Manual integrations have been initialled and dated by the analyst.

The "Y" flag is used as a qualifier on the Form I VOA-TIC to indicate a siloxane contaminant attributed to trap breakdown.

The "N" flag used on the Form I VOA-TIC indicates that there is the presumptive evidence of a compound based on the mass spectral library search and the interpretation of the mass spectral interpretation specialist.

The "D" flag is used on the surrogate and spike recoveries to designate they were diluted out.

IEA

SDG NARRATIVE VOLATILE FRACTION

The following nonconformances associated with the analysis of the samples in this case are as follows:

Sample number 04 (client ID ACS-SB118SS3-6'-8') was used for the medium level soil matrix spike/matrix spike duplicate (MS/MSD). Due to the high dilution factor most of the spike compounds did not recover. This is designated with the "D" flag on the percent recoveries.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his designee, as verified by the following signature.

Brian D. Neptune 03/05/96

Brian D. Neptune  
Lead Analyst, GC/MS Final Review  
IEA, Inc.

IEA

SDG NARRATIVE PESTICIDE FRACTION

CASE: 1589-126

SDG NO.:01511

CONTRACT: SOW 1/91

Samples: (8) Soil Samples

This case was closed on February 1, 1996. Each sample has been assigned a 9-character IEA lab identification number.

The chromatographic separation of the analytes was performed using a J & W 30 m X 0.53 mm DB-1701 fused silica capillary column with a 1.0  $\mu$ m bonded phase film thickness and a Restek 30 m X 0.53 mm Rt<sub>x</sub>-35 fused silica capillary column with a 1.0  $\mu$ m bonded phase film thickness. The Rt<sub>x</sub>-35 column used as one of the analytical columns is equivalent to the DB-608 column specified in the SOW.

The filenames have an extension of ".D" to denote the use of the ASCII file generated by the data system to produce the forms. Two significant figures were reported for the "calculated amount" on Form VII PEST-1 and -2. All of the initial pesticide chromatograms were missing the scaling factor; however, the scaling factor (in mV scale) appeared for the re-plotted chromatograms.

Gel Permeation Cleanup (GPC) was performed using a column series: a 19 X 300 mm Waters UltraStyragel column paired with a 19 X 150 mm Waters UltraStyragel column. The additional column provides the additional resolution needed to achieve the criteria for pesticide analysis. This column combination meets the equivalency criteria in paragraph 10.1.8.1.2, page D-43/PEST. A 2 mL injection loop is utilized by the GPC system.

All soil sample extracts underwent GPC as required by the SOW. Florisil column cleanup was performed on all sample extracts as required by the SOW.

The "P" flag is used to designate that there is a greater than 25% difference in the detected concentration of an analyte between the two analytical columns.

The "J" flag is used to designate target compounds reported below the quantitation limits.

The "\*" used on the Form III PEST designates percent recoveries and/or RPD's are outside the QC limits.

The "D" flag indicates a target compound that is reported in the more dilute analysis.

Any nonconformances associated with the analysis of the samples in this case are note as follows:

The Matrix Spike/Matrix Spike Duplicate had zero (0) percent recovery due to sample dilution.

The aroclor 1254 present in the samples had high percent differences on the RTX-35 column due to overlapping of the aroclor 1248 pattern.

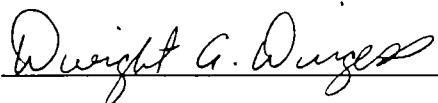


IEA

SDG NARRATIVE PESTICIDE FRACTION

All samples were analyzed at dilutions due to target compounds that exceeded the calibration range. The surrogate recoveries were below the advisory limits due to dilutions and sample matrix interference.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his designee, as verified by the following signature.

 03/07/96

Dwight A. Dingess  
GC SV Lead Analyst  
IEA, Inc.

Review Date:

Reviewed by:

Review of Contract Data; SMO Case No. 1589-126

Site Name: ACS

Contract Lab: IEA-CT

Contract No.:

Project No.: 4077.0076

SMO Traffic No's:

Sample Matrix: Low Level ☐ Med. Level ☒ High Level ☐ Soil/Seq ☒

Water ☐ Waste ☐

## I. HOLDING TIMES

~~Water:~~ VOA ~~SV~~ PEST  
Sed/Soil: VOA NA SV NA PEST A

- A - Acceptable - All contract and 40 CFR 136 holding times met.  
P - Provisional - Some contract and 40 CFR 136 holding times exceeded.  
U - Unacceptable - All holding times exceeded.

REMARKS: PCBs - All soil samples were extracted within the recommended holding time of 14 days. Subsequently, all extracts were analyzed within 40 days of sample extraction.

## II. GC/MS TUNING AND PERFORMANCE

~~Water:~~ VOA (BFB) ~~SV (DFTPP)~~  
Sed/Soil: VOA (BFB) NA SV (DFTPP) NA

- A - Acceptable - All criteria met, spectra of good quality.  
P - Provisional - All criteria not met, spectra of reasonable quality; data usable.  
U - Unacceptable - Criteria not met, spectra of poor quality, data unusable.

### PCB Instrument Performance

INSTRUMENTS - HP 5890 P4 COLUMN DB-1701, 30 meter, 0.53mm ID  
HP 5890 P1 COLUMN RTX-35, 30 meter, 0.53mm ID  
HP 5890 P2 COLUMN DB-1701, 30 meter, 0.53mm ID

- TETRACHLORO M-XYLENE AND DECACHLOROBIPHENYL RETENTION TIME CHECK

- MANY SAMPLES WITH SUBSTITUTES AT NO RECOVERY DUE TO SAMPLE DILUTIONS

- ANALYTE RESOLUTION CHECK DB1701 RESC15 02/02/96 } ALL RESOLUTION BETWEEN TWO  
RTX 35 RESC19 02/15/96 } ADJACENT PEAKS > 60% OF  
DB1701 RESC03 02/21/96 } THE HEIGHT OF THE SMALLER PEAK

- FLORISIL CARTRIDGE CHECK - Lot # 170AC - ALL RECOVERIES WITHIN Q.C. LIMITS OF 80-120%

- GPC CALIBRATION - GPC COLUMN ULTRASTRAGEL - ALL RECOVERIES WITHIN Q.C. LIMITS OF 80-110%

SMD Case No.: 1589-126

Contract Lab: IEA-CT

### III. INITIAL AND CONTINUING CALIBRATION CHECKS

Water: VOA SV PEST  
Sed/Soil: VOA NA SV NA PEST A

- A - Acceptable - All criteria met.  
P - Provisional - Some criteria not met, data usable, see remarks.  
U - Unacceptable - Criteria not met, data unusable, see remarks.

#### REMARKS:

Initial - Instrument # HP5890 P1 02/15/96 01:45 → 02/21/96 23:56  
Instrument # HP5890 P2 02/12/96 00:57 → 02/18/96 01:24  
Instrument # HP5890 P4 02/21/96 18:49 → 02/26/96 11:34

- PCB DATA IS ACCEPTABLE

### IV. BLANK ANALYSIS

Water: VOA SV PEST  
Sed/Soil: VOA NA SV NA PEST (A)

- A - Acceptable - No contaminants above minimum detection limit, no interference with sample results, appropriate blank for each GC/MS system and extraction method.  
P - Provisional - Contaminants present but minimal interference with sample results.  
U - Unacceptable - Gross contamination, too much interference to use data for certain components or the entire fraction, appropriate blanks not analyzed.

~~NO REPORT FOR PBLK92 INCLUDED IN THE DATA PACKAGE~~ MOP 3/22/96

- NO BLANK ANALYSED ON INSTRUMENT HP5890P4

- OTHER BLANKS ACCEPTABLE

SMO Case No.: 1589-126Contract Lab: IEA-CT

## V. SURROGATE SPIKE RESULTS

Water: VOA SV PEST  
 Sed/Soil: VOA NA SV NA PEST X *All Surrogates Diluted Out*

NOTE: Sample data flagged on individual basis.

## A. Individual sample flagging criteria.

Acceptable - All surrogate recoveries within criteria.Suspect - Any surrogate recoveries outside criteria and/or recoveries of <10% substantiated as a matrix effect.Invalid - Any recoveries of <10% that are unsubstantiated as a matrix effect.

		No. Samples	No. Suspect	No. Invalid
<del>Water:</del>	<del>VOA</del>	<del>_____</del>	<del>_____</del>	<del>_____</del>
	<del>SV</del>	<del>_____</del>	<del>_____</del>	<del>_____</del>
	<del>PEST</del>	<del>_____</del>	<del>_____</del>	<del>_____</del>
Sed/Soil:	VOA	_____	_____	_____
	SV	_____	_____	_____
	PEST	_____	_____	_____

## B. Summary of Surrogates

A - Acceptable - <10% of samples reported as suspect.P - Provisional - >10% but <50% of samples reported as suspect.U - Unacceptable - >50% of samples reported as suspect and/or >10% samples reported as invalid.

## REMARKS:

- BLANK SURROGATE RECOVERIES WITHIN ADVERSELY LIMITS OF 60-150%

- ALL SAMPLES WITH SURROGATES DILUTED OUT ARE TO HIGH  
SAMPLE PEB CONCENTRATIONS WITH THE EXCEPTION OF 55113.

MO Case No.: 1589-126

Contract Lab: IEA-CT

II. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. MATRIX SPIKE RESULTS:

Water: ~~VOA~~ ~~SV~~ ~~PEST~~  
 Sed/Soil: VOA NA SV NA PEST \* *ALL PCB SPIKING DILUTED OUT*

NOTE: No action taken on Matrix Spike Results alone.

- A - Acceptable - <10% of compounds outside criteria.  
 P - Provisional - >10% but <50% of compounds outside criteria.  
 U - Unacceptable - >50% of compounds outside criteria and/or >10% of compounds with recoveries of <10%.

	No. Compounds	No. Outside Criteria	No. <10% Recovery
<del>Water:</del>	<del>VOA</del>	<del></del>	<del></del>
<del>SV</del>	<del></del>	<del></del>	<del></del>
<del>PEST</del>	<del></del>	<del></del>	<del></del>
Sed/Soil:	VOA		
<del>SV</del>	<del></del>	<del></del>	<del></del>
PEST	<u>1</u>	<u>1</u>	<u>1</u>

B. DUPLICATE RESULTS

Water: ~~VOA~~ ~~SV~~ ~~PEST~~  
 Sed/Soil: VOA NA SV NA PEST

- A - Acceptable - <10% of compounds outside criteria.  
 P - Provisional - >10% but <50% of compounds outside criteria.  
 U - Unacceptable - >50% of compounds outside criteria and/or >10% of compounds with recoveries of <10%.

	No. Compounds	No. Outside Criteria
<del>Water:</del>	<del>VOA</del>	<del></del>
<del>SV</del>	<del></del>	<del></del>
<del>PEST</del>	<del></del>	<del></del>
Sed/Soil:	VOA	
<del>SV</del>	<del></del>	<del></del>
PEST	<u>1</u>	<u>1</u>

REMARKS:

*— ALL SPIKING COMPOUNDS DILUTED OUT (ANALOR 1260)*

SMD Case No.: 1589-126

Contract Lab: IEA-CT

## VII. FIELD DUPLICATES

Water: VOA SV PEST P  
Sed/Soil: VOA NA SV NA PEST P

A - Acceptable - All compounds are within 25% of each other for waters or within 50% of each other for soils.

P - Provisional - Some compounds are greater than 25% RPD for waters and greater than 50% RPD for soils, see remarks.

U - Unacceptable - Professional judgement, see remarks.

## REMARKS:

[illegible]

MO Case No.: 1589-126

Contract Lab: IEA-CT

III. INTERNAL STANDARD PERFORMANCE

~~Water:~~ VOA ~~SV~~ PEST  
Sed/Soil: VOA NA SV NA PEST NA

A - Acceptable - Is area counts between - 50% to +100% from associated calibration standard and  $\pm 30$  seconds from associated calibration standards.

P - Provisional - Most all area counts between -50% to +100% and  $\pm 30$  seconds, from associated calibration standard, see remarks.

U - Unacceptable - Extremely low area counts or major abrupt drop-off of sensitivity or greater than  $\pm 30$  second time shift, see remarks.

REMARKS:

*PLHs - Not Applicable*

IX. COMPOUND IDENTIFICATION

~~Water:~~ VOA ~~SV~~ PEST  
Sed/Soil: VOA NA SV NA PEST A

A - Acceptable - All compounds within retention time windows, spectral criteria met.

P - Provisional - Some criteria not met, data usable, see remarks.

U - Unacceptable - Criteria not met, data unusable, see remarks.

REMARKS:

*PLHs REJECTED BY PATTERN RECOGNITION - MULTIPLE PKs - RT WINDOWS REQUIRED.*

SMD Case No.: 1589-126

Contract Lab: IEA-CT

X. COMPOUND QUANTIFICATION AND REPORTED D.L.

~~Water:~~ VOA SV PEST SV  
Sed/Soil: VOA NA SV NA PEST SV

- A - Acceptable - Compounds were quantified, as well as the adjustment of the CRQL, was calculated according for the SOW or SAS.
- P - Provisional - Some criteria not met, data usable, see remarks.
- U - Unacceptable - Gross problems, interferences, unacceptable RT and RRF shifts, see remarks.

REMARKS:

*PLBS - 3PKS USED FOR QUANTIFICATION - ACCEPTABLE*

*DETECTION LIMITS PROPERLY ADJUSTED FOR DIRECTIONS AND % MOISTURE.*

XI. SYSTEM PERFORMANCE

~~Water:~~ VOA SV PEST SV  
Sed/Soil: VOA NA SV NA PEST A

- A - Acceptable - No indication of instrument problems such as baseline shifts, I.S. absolute area changes, etc.
- P - Provisional - Indication of minor problems, see remarks.
- U - Unacceptable - Indication of instrument problems, see remarks.

REMARKS:

*PLB INSTRUMENT PERFORMANCE ACCEPTABLE*



IEA Assigned Number Index

Case No.: 1589-126

SDG No.: 01511

IEA Lab Sample Number	Sample Number	Abbreviated Sample Number
9601511-01	ACS-SB110SS4-7'-9'	0SS479
9601511-02	ACS-SB112SS5-9'-11'	SS5911 ✓
9601511-03	ACS-SB113SS4-7'-9'	3SS479 ✓
9601511-21	HB01511	HB
9602124-04	ACS-SB118SS3-6'-8'	8SS368
9602124-05	ACS-SB119SS3-6'-8'	9SS368
9602124-06	ACS-SB124SS4-8.5'-10.5'	485105 ✓
9602124-07	ACS-SB127SS3-6'-8'	7SS368 ✓
9602124-08	ACS-SB128SS3-6'-8'	8SS368 ✓
9602124-09	ACS-SB129SS5-11'-13'	S51113 ✓
9602124-10	ACS-SB214SS6-13.5'-15.5'	135155 ✓
9602124-11	ACS-SB128SS3-6'-8' DUP	SS368D ✓

VOLATILES

VOLATILES

VOLATILES

# VALIDATED

ACS-SB214-SS6 13.5-15.5'

## 1D PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

135155

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

*DATE SAMPLED = 1/26/96*  
SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212410

Sample wt/vol: 30.2 (g/mL) G

Lab File ID: P1021496\_059.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 02/01/96 (6)

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96 (14)

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/17/96 (22)

Injection Volume: 1.0(uL)

Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.9

Sulfur Cleanup: (Y/N) N

*CR/R MULTIPLIER = 11.21*

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

Q

12674-11-2-----Aroclor-1016	370	U
11104-28-2-----Aroclor-1221	760	U
11141-16-5-----Aroclor-1232	370	U
53469-21-9-----Aroclor-1242	370	U
12672-29-6-----Aroclor-1248	3200	
11097-69-1-----Aroclor-1254	370	U
11096-82-5-----Aroclor-1260	370	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

135155DL

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212410DL

Sample wt/vol: 30.2 (g/mL) G

Lab File ID: P1021496\_104.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/20/96

Injection Volume: 1.0(uL)

Dilution Factor: 100.0

GPC Cleanup: (Y/N) Y pH: 6.9

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
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12674-11-2-----Aroclor-1016	3700	U
11104-28-2-----Aroclor-1221	7600	U
11141-16-5-----Aroclor-1232	3700	U
53469-21-9-----Aroclor-1242	3700	U
12672-29-6-----Aroclor-1248	2700	DJ
11097-69-1-----Aroclor-1254	3700	U
11096-82-5-----Aroclor-1260	3700	U

# VALIDATED

ACS-58113-554 7-9'

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

3SS479

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

DATE SAMPLED = 1/23/96  
SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960151103

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P2020196\_187.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 01/25/96 (2)

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/01/96 (9)

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/13/96 (21)

Injection Volume: 1.0(uL)

Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.4

Sulfur Cleanup: (Y/N) N

CRDL MULTIPLIER = 11.51

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

Q

12674-11-2-----Aroclor-1016	380	U
11104-28-2-----Aroclor-1221	760	U
11141-16-5-----Aroclor-1232	380	U
53469-21-9-----Aroclor-1242	3300	
12672-29-6-----Aroclor-1248	380	U
11097-69-1-----Aroclor-1254	650	P
11096-82-5-----Aroclor-1260	380	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

3SS479DL

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960151103DL

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P2020196\_186.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 01/25/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/01/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/13/96

Injection Volume: 1.0(uL)

Dilution Factor: 100.0

GPC Cleanup: (Y/N) Y pH: 7.4

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
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12674-11-2-----Aroclor-1016	3800	U
11104-28-2-----Aroclor-1221	7600	U
11141-16-5-----Aroclor-1232	3800	U
53469-21-9-----Aroclor-1242	3600	DJ
12672-29-6-----Aroclor-1248	3800	U
11097-69-1-----Aroclor-1254	530	DJP
11096-82-5-----Aroclor-1260	3800	U

# VALIDATED

ACS-SB124-SS4 8.5-10.5'

## 1D PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

485105

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

DATE SAMPLED = 1/26/96

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212406

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P1021496\_060.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96 (14)

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/17/96 (22)

Injection Volume: 1.0(uL)

Dilution Factor: 2.0

GPC Cleanup: (Y/N) Y pH: 7.5

Sulfur Cleanup: (Y/N) N

CRQL MULTIPLIER = 2.27

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

Q

12674-11-2-----Aroclor-1016		75	U
11104-28-2-----Aroclor-1221		150	U
11141-16-5-----Aroclor-1232		75	U
53469-21-9-----Aroclor-1242		75	U
12672-29-6-----Aroclor-1248	P	2200	P
11097-69-1-----Aroclor-1254	P	1200	P
11096-82-5-----Aroclor-1260	P	340	P

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

485105DL

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212406DL

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P1021496\_044.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 01/25/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/16/96

Injection Volume: 1.0(uL)

Dilution Factor: 20.0

GPC Cleanup: (Y/N) Y pH: 7.5

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
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12674-11-2-----Aroclor-1016	750	U
11104-28-2-----Aroclor-1221	1500	U
11141-16-5-----Aroclor-1232	750	U
53469-21-9-----Aroclor-1242	750	U
12672-29-6-----Aroclor-1248	3700	D
11097-69-1-----Aroclor-1254	1900	DP
11096-82-5-----Aroclor-1260	510	DJP

# VALIDATED

ACS-SB/27-553 6-8'

1D

## PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

7SS368

Lab Name: INDUSTRIAL &amp; ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

DATE SAMPLED = 1/30/96  
SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212407

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: P1021496\_046.D

% Moisture: 27 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96 (10)

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/16/96 (17)

Injection Volume: 1.0(uL)

Dilution Factor: 20.0

GPC Cleanup: (Y/N) Y pH: 5.9

Sulfur Cleanup: (Y/N) N

CRQL MULTIPLIER = 27.27  
CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

CAS NO.	COMPOUND		
12674-11-2-----	Aroclor-1016	900	U
11104-28-2-----	Aroclor-1221	1800	U
11141-16-5-----	Aroclor-1232	900	U
53469-21-9-----	Aroclor-1242	900	U
12672-29-6-----	Aroclor-1248	900	U
11097-69-1-----	Aroclor-1254	35000	
11096-82-5-----	Aroclor-1260	900	U



1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

7SS368DL

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212407DL

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: P1021496\_040.D

% Moisture: 27 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/16/96

Injection Volume: 1.0(uL)

Dilution Factor: 200.0

GPC Cleanup: (Y/N) Y pH: 5.9

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
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12674-11-2-----Aroclor-1016	9000	U
11104-28-2-----Aroclor-1221	18000	U
11141-16-5-----Aroclor-1232	9000	U
53469-21-9-----Aroclor-1242	9000	U
12672-29-6-----Aroclor-1248	9000	U
11097-69-1-----Aroclor-1254	44000	D
11096-82-5-----Aroclor-1260	9000	U

# VALIDATED

ACS-SB128-SS3 6-8'

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

8SS368

Lab Name: INDUSTRIAL &amp; ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

DATE SAMPLED = 11/30/96

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212408

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: P1021496\_047.D

% Moisture: 20 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96 (10)

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/16/96 (17)

Injection Volume: 1.0(uL)

Dilution Factor: 20.0

GPC Cleanup: (Y/N) Y pH: 6.7

Sulfur Cleanup: (Y/N) N

CKDL MULTIPLIER = 24.85

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

Q

12674-11-2-----Aroclor-1016	820	U
11104-28-2-----Aroclor-1221	1700	U
11141-16-5-----Aroclor-1232	820	U
53469-21-9-----Aroclor-1242	820	U
12672-29-6-----Aroclor-1248	820	U
11097-69-1-----Aroclor-1254	P 7500	P
11096-82-5-----Aroclor-1260	P 7300	P

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

8SS368DL

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212408DL

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: P1021496\_041.D

% Moisture: 20 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/01/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/16/96

Injection Volume: 1.0(uL)

Dilution Factor: 200.0

GPC Cleanup: (Y/N) Y pH: 6.7

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	8200	U
11104-28-2-----Aroclor-1221	17000	U
11141-16-5-----Aroclor-1232	8200	U
53469-21-9-----Aroclor-1242	8200	U
12672-29-6-----Aroclor-1248	8200	U
11097-69-1-----Aroclor-1254	12000	D
11096-82-5-----Aroclor-1260	12000	D

# VALIDATED

ACS - 98129-555 11-13<sup>1</sup>

## 1D PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

S51113

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

DATE SAMPLED = 1/30/96  
SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212409

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P1021496\_061.D

% Moisture: 11 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96 (10)

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/17/96 (18)

Injection Volume: 1.0(uL)

Dilution Factor: 2.0

GPC Cleanup: (Y/N) Y pH: 8.1

Sulfur Cleanup: (Y/N) N

CRR MULTIPLIER = 2.24

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

Q

12674-11-2-----Aroclor-1016	74	U
11104-28-2-----Aroclor-1221	150	U
11141-16-5-----Aroclor-1232	74	U
53469-21-9-----Aroclor-1242	74	U
12672-29-6-----Aroclor-1248	1200	P
11097-69-1-----Aroclor-1254	760	P
11096-82-5-----Aroclor-1260	74	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

S51113DL

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212409DL

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P1021496\_045.D

% Moisture: 11 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/16/96

Injection Volume: 1.0(uL)

Dilution Factor: 20.0

GPC Cleanup: (Y/N) Y pH: 8.1

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	740	U
11104-28-2-----Aroclor-1221	1500	U
11141-16-5-----Aroclor-1232	740	U
53469-21-9-----Aroclor-1242	740	U
12672-29-6-----Aroclor-1248	1600	D
11097-69-1-----Aroclor-1254	710	DJP
11096-82-5-----Aroclor-1260	740	U

# VALIDATED

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

ACS-SB128-553 6-8 '041

CLIENT SAMPLE NO.

SS368D

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

DATE SAMPLED = 1/30/96  
SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212411

Sample wt/vol: 30.2 (g/mL) G

Lab File ID: P1021496\_058.D

% Moisture: 16 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96 (10)

Concentrated Extract Volume: 5000 (uL)

Date Analyzed: 02/17/96 (8)

Injection Volume: 1.0 (uL)

Dilution Factor: 20.0

GPC Cleanup: (Y/N) Y pH: 7.8

Sulfur Cleanup: (Y/N) N

CRQ2 MULTIPLIER = 23.64

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NO.

COMPOUND

Q

12674-11-2-----Aroclor-1016	780	U
11104-28-2-----Aroclor-1221	1600	U
11141-16-5-----Aroclor-1232	780	U
53469-21-9-----Aroclor-1242	780	U
12672-29-6-----Aroclor-1248	780	U
11097-69-1-----Aroclor-1254	P 4200	P
11096-82-5-----Aroclor-1260	3100	

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

SS368DDL

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212411DL

Sample wt/vol: 30.2 (g/mL) G

Lab File ID: P1021496\_042.D

% Moisture: 16 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/16/96

Injection Volume: 1.0(uL)

Dilution Factor: 200.0

GPC Cleanup: (Y/N) Y pH: 7.8

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	7800	U
11104-28-2-----Aroclor-1221	16000	U
11141-16-5-----Aroclor-1232	7800	U
53469-21-9-----Aroclor-1242	7800	U
12672-29-6-----Aroclor-1248	7800	U
11097-69-1-----Aroclor-1254	4600	DJP
11096-82-5-----Aroclor-1260	3700	DJ

# VALIDATED

ACS-SB112-SS5 9-11'

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

SS5911

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

DATE SAMPLED = 1/23/96  
SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960151102

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P2020196\_189.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 01/25/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/01/96 (9)

Concentrated Extract Volume: 5000 (uL)

Date Analyzed: 02/13/96 (21)

Injection Volume: 1.0 (uL)

Dilution Factor: 50.0

GPC Cleanup: (Y/N) Y pH: 7.6

Sulfur Cleanup: (Y/N) N

CRQL MULTIPLIER = 57.58

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

Q

12674-11-2-----Aroclor-1016	1900	U
11104-28-2-----Aroclor-1221	3800	U
11141-16-5-----Aroclor-1232	1900	U
53469-21-9-----Aroclor-1242	1900	U
12672-29-6-----Aroclor-1248	P 3000	P
11097-69-1-----Aroclor-1254	P 4500	P
11096-82-5-----Aroclor-1260	1900	U



1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

SS5911DL

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960151102DL

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P2020196\_188.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 01/25/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/01/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/13/96

Injection Volume: 1.0(uL)

Dilution Factor: 500.0

GPC Cleanup: (Y/N) Y pH: 7.6

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
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12674-11-2-----Aroclor-1016	19000	U
11104-28-2-----Aroclor-1221	38000	U
11141-16-5-----Aroclor-1232	19000	U
53469-21-9-----Aroclor-1242	19000	U
12672-29-6-----Aroclor-1248	3400	DJP
11097-69-1-----Aroclor-1254	5700	DJP
11096-82-5-----Aroclor-1260	19000	U

# VALIDATED

ACS-SB149-SS4 8.5-10.5

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

149554-8.5/10

DATE SAMPLED = 02/12/96

Lab Name: IEA-CT Contract: \_\_\_\_\_

Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: Z0219

Matrix: (soil/water): SOIL

Lab Sample ID: 0219001 0011

Sample wt/vol: 30 (g/ml) G

Lab File ID: B5213CLP326

% Moisture: 18 decanted: (Y/N) N

Date Received: 02/16/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/16/96 ④

Concentrated Extract Volume: 5000 (uL)

Date Analyzed: 02/17/96 ①

Injection Volume: 1.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.7

Sulfur Cleanup: (Y/N) N

CRQL MULTIPLIER = 1.21

CAS NO. COMPOUND

CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

# VALIDATED

ACS-58149-557 16-18

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

149557-16/18

DATE SAMPLED = 02/12/96

Lab Name: IEA-CT Contract: \_\_\_\_\_

Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: Z0219

Matrix: (soil/water): SOIL

Lab Sample ID: 0219002017

Sample wt/vol: 30 (g/ml) G

Lab File ID: B5213CLP327

% Moisture: 20 decanted: (Y/N) N

Date Received: 02/16/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/16/96 ④

Concentrated Extract Volume: 5000 (uL)

Date Analyzed: 02/17/96 ①

Injection Volume: 1.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.3

Sulfur Cleanup: (Y/N) N

CAQL MULTIPLIER = 1.24

CAS NO. COMPOUND

CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	41	U
11104-28-2	Aroclor-1221	84	U
11141-16-5	Aroclor-1232	41	U
53469-21-9	Aroclor-1242	41	U
12672-29-6	Aroclor-1248	41	U
11097-69-1	Aroclor-1254	41	U
11096-82-5	Aroclor-1260	41	U

# VALIDATED

ACS-58150-553 6-8'

ID  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

150553-6/8

DATE SAMPLED = 1/13/96

Lab Name: IEA-CT Contract: \_\_\_\_\_

Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: Z0219

0025

Matrix: (soil/water): SOIL

Lab Sample ID: 0219003

Sample wt/vol: 30 (g/ml) G

Lab File ID: B5213CLP328

% Moisture: 19 decanted: (Y/N) N

Date Received: 02/16/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/16/96 ③

Concentrated Extract Volume: 5000 (uL)

Date Analyzed: 02/17/96 ①

Injection Volume: 1.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.9

Sulfur Cleanup: (Y/N) N

CAROL MULTIPLIER = 1.24

CAS NO. COMPOUND

CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	41	U
11104-28-2	Aroclor-1221	83	U
11141-16-5	Aroclor-1232	41	U
53469-21-9	Aroclor-1242	41	U
12672-29-6	Aroclor-1248	500	
11097-69-1	Aroclor-1254	150	
11096-82-5	Aroclor-1260	49.	

# VALIDATED

ACS-86151-553 5-7'

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

151553-5/7

DATE SAMPLED=02/13/96

Lab Name: IEA-CT Contract: \_\_\_\_\_Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: Z0219Matrix: (soil/water): SOILLab Sample ID: 0219004 2036Sample wt/vol: 30 (g/ml) GLab File ID: B5213CLP329% Moisture: 18 decanted: (Y/N) NDate Received: 02/16/96Extraction: (SepF/Cont/Sonc) SONCDate Extracted: 02/16/96 ③Concentrated Extract Volume: 5000 (uL)Date Analyzed: 02/17/96 ①Injection Volume: 1.0 (uL)Dilution Factor: 1.0GPC Cleanup: (Y/N) Y pH: 6.6Sulfur Cleanup: (Y/N) N

CRQL MULTIPLIER = 1.21

CAS NO. COMPOUND

CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

VALIDATED

ACS-56151-555 9-11'

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

151555-9/11

DATE SAMPLED = 2/13/96

Lab Name: IEA-CT Contract: \_\_\_\_\_

Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: Z0219

Matrix: (soil/water): SOIL

Lab Sample ID: 0219005

Sample wt/vol: 30 (g/ml) G

Lab File ID: B5213CLP330

% Moisture: 15 decanted: (Y/N) N

Date Received: 02/16/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/16/96 (1)

Concentrated Extract Volume: 5000 (uL)

Date Analyzed: 02/17/96 (1)

Injection Volume: 1.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7

Sulfur Cleanup: (Y/N) N

CRQL MULTIPLIER = 1.18

CAS NO. COMPOUND

CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	39	U
11104-28-2	Aroclor-1221	79	U
11141-16-5	Aroclor-1232	39	U
53469-21-9	Aroclor-1242	39	U
12672-29-6	Aroclor-1248	39	U
11097-69-1	Aroclor-1254	39	U
11096-82-5	Aroclor-1260	39	U

# VALIDATED

ACS-SB152-SS4 7-9'

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

152554-7/9

DATE SAMPLED = 2/13/96

Lab Name: IEA-CT Contract: \_\_\_\_\_

Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: Z0219

0052

Matrix: (soil/water): SOIL

Lab Sample ID: 0219006

Sample wt/vol: 30 (g/ml) G

Lab File ID: B5213CLP331

% Moisture: 19 decanted: (Y/N) N

Date Received: 02/16/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/16/96 ③

Concentrated Extract Volume: 5000 (uL)

Date Analyzed: 02/17/96 ①

Injection Volume: 1.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.9

Sulfur Cleanup: (Y/N) N

CRQL MULTIPLIER = 1.24

CAS NO. COMPOUND

CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	41	U
11104-28-2	Aroclor-1221	83	U
11141-16-5	Aroclor-1232	41	U
53469-21-9	Aroclor-1242	41	U
12672-29-6	Aroclor-1248	41	U
11097-69-1	Aroclor-1254	41	U
11096-82-5	Aroclor-1260	41	U

# VALIDATED

ACS-SB/52-SS5 9-11'

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

152555-9/11

DATE SAMPLED = 02/13/96

Lab Name: IEA-CT Contract: \_\_\_\_\_

Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: Z0219

Matrix: (soil/water): SOIL

Lab Sample ID: 0219007 0059

Sample wt/vol: 30 (g/ml) G

Lab File ID: B5213CLP332

% Moisture: 19 decanted: (Y/N) N

Date Received: 02/16/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/16/96 ③

Concentrated Extract Volume: 5000 (uL)

Date Analyzed: 02/17/96 ①

Injection Volume: 1.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.2

Sulfur Cleanup: (Y/N) N

CRQL MULTIPLIER = 1.24

CAS NO. COMPOUND

CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	41	U
11104-28-2	Aroclor-1221	83	U
11141-16-5	Aroclor-1232	41	U
53469-21-9	Aroclor-1242	41	U
12672-29-6	Aroclor-1248	41	U
11097-69-1	Aroclor-1254	41	U
11096-82-5	Aroclor-1260	41	U



ORGANICS  
DATA VALIDATION NARRATIVE

Site Name ACS Project # 4077 0076  
 SMO Case # (SAS #) 0219 #Samples/Matrix 7/SOILS  
 Laboratory IEA-CT Hours for Review \_\_\_\_\_  
 SOW # OLM01.9 EPA Validation Guidelines # REGION II  
 Sample Numbers 0219001 → 0219007  
 Validated By M/A RH Date 3/21/96  
 Reviewed By \_\_\_\_\_ Date \_\_\_\_\_

## SUMMARY OF REVIEW:

PCBS  
(SWIC)I. HOLDING TIMES - SAMPLES EXTRACTED AND ANALYZED WITHIN HOLDING TIMESII. PCB INSTRUMENT PERFORMANCE -

- INSTRUMENT # HP5890 5B - COLUMN DB-1701 01/18/96 → 2/17/96  
 HP5890 01A - COLUMN RTX-35 02/05/96 → 02/17/96

III. CALIBRATION -

INITIAL - INSTRUMENT # HP5890 5B 01/18/96 → 01/19/96 - ALPHA BHC % RSD @ 23.3%; ALL OTHERS ≤ 20%  
 INSTRUMENT # HP5890 01A 02/05/96 → 02/06/96 - DIELPHIN % RSD @ 22.3%; ENDOSULFAN II % RSD @ 22%  
 ALL OTHERS ≤ 20%  
CONTINUING - INDOAM 35 - RTX 35 (HP5890 01A) - 4.4' DOT w/RPD @ 35%; ALL OTHER PM, INDOAM, INOBN  
 WITH %D ≤ 25% (D.K. - SAMPLES FOR PCBs ONLY)

IV. BLANK ANALYSIS - PBCK 86 - 02/17/96 11:28 (DB-1701)

02/17/96 12:00 (RTX-35)

- NO DETECTS IN BLANK ASSOCIATED W/ THESE SAMPLES

V. SURROGATE RECOVERIES -

DECAChlorOBIPHEYL OUTSIDE ADVISORY Q.C. LIMITS OF 60-150% AT 701% ON RTX-35 COLUMN, COLUMN #1 (DB-1701) RECOVERY ACCEPTABLE. NO QUALIFIERS FOR SURROGATE ALLOWMENT. ALL OTHER RECOVERIES WITHIN ADVISORY Q.C. LIMITS.

VI. MATRIX SPIKE / MATRIX SPIKE DUPLICATE (MS/MSD) -

- SPIKE CONSISTED OF ANOCLOAS 1242 &amp; 1260 - ALL RECOVERIES AND RPD(%) WITHIN Q.C. LIMIT

VII. FIELD DUPLICATES - NO FIELD DUPLICATES INCLUDED IN THIS SAMPLE DESIGNATION GROUPVIII. COMPOUND IDENTIFICATION - PCBs IDENTIFIED BY PATTERN RECOGNITION - COMPARED TO KNOWN STANDARDS.

NOTE: ANOCLOAS WEREN'T RUN WITHIN 72 HOURS OF THEIR DETECTION IN SAMPLE ACS-SB150-SS  
 THESE WERE FOR PATTERN RECOGNITION ONLY AND DATA WAS NOT AFFECTED. 6-5'

IX. COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS -

- DETECTION LIMITS PROPERLY ADJUSTED FOR % MOISTURE

\*: 0001

## SDG NARRATIVE

CLIENT:  
P.O.#:  
PROJECT I.D.  
SDG#  
IEA I.D.

MONTGOMERY WATSON  
4077-0075  
4077-0075  
Z0219  
3096-0219



# IEA

An Aquarion Company

200 Monroe Turnpike  
Monroe, Connecticut 06468

Phone 203-261-4458  
Fax 203-268-5346

001 A

3096-0219  
MONTGOMERY WATSON

SDG Narrative

Polychlorinated Biphenyls (PCB's) - PCB samples were extracted and analyzed by GC/ECD using USEPA CLP Protocols, OLM01.9. The instrumentation used was a Hewlett-Packard Gas Chromatograph equipped with an Electron Capture Detector ( $\text{Ni}^{63}$ ).

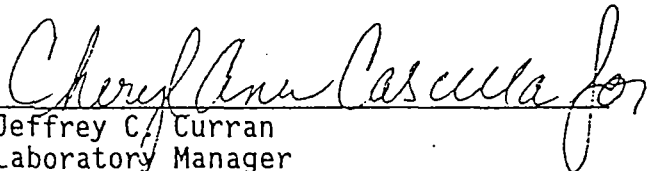
All samples were extracted and concentrated without any apparent problems.

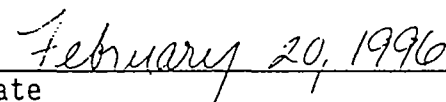
Surrogate recoveries were outside the advisory QC limits on one or both columns for sample 151555-9/11 due to sample matrix interference.

The percent RPD for 4,4'-DDT was outside the QC limits for continuing standard INDAM35 on column RTX-35.

Aroclors were not run within 72 hours of their detection in sample 150553-6/8. These were for pattern recognition only and the data was not affected.

I certify that this data package is in compliance with the terms of this contract, both technically and for completeness, for other than the conditions detailed above. Release of this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

  
Jeffrey C. Curran  
Laboratory Manager

  
Date

Review Date:

Reviewed by:

Review of Contract Data; SMO Case No. 0219  
Site Name: ACS Contract Lab: IEA-CT  
Contract No.: \_\_\_\_\_ Project No.: 4077.0076  
SMO Traffic No's: 0219001 → 0219007  
Sample Matrix: Low Level X Med. Level \_\_\_\_\_ High Level \_\_\_\_\_ Soil/Seq X  
Water \_\_\_\_\_ Waste \_\_\_\_\_

## I. HOLDING TIMES

~~Water:~~ VOA \_\_\_\_\_ SV \_\_\_\_\_ PEST \_\_\_\_\_  
Sed/Soil: VOA NA SV NA PEST A

- A - Acceptable - All contract and 40 CFR 136 holding times met.  
P - Provisional - Some contract and 40 CFR 136 holding times exceeded.  
U - Unacceptable - All holding times exceeded.

### REMARKS:

PCBS - SAMPLES EXTRACTED AND ANALYZED WITH-IN HOLDING TIMES.  
3 DAY TURN-AROUND-TIME REQUESTED.

## II. GC/MS TUNING AND PERFORMANCE

~~Water:~~ VOA (BFB) \_\_\_\_\_ SV (DFTPP) \_\_\_\_\_  
Sed/Soil: VOA (BFB) NA SV (DFTPP) NA

- A - Acceptable - All criteria met, spectra of good quality.  
P - Provisional - All criteria not met, spectra of reasonable quality;  
date usable.  
U - Unacceptable - Criteria not met, spectra of poor quality, data unusable.

### PCB Instrument Performance -

Instruments - HP 5890 SB COLUMN DB-1701, 30 METER, 0.53mm ID  
HP 5890 1A COLUMN RTX-35, 30 METER, 1.53mm ID

#### • TETRACHLORO M-XYLENE AND DECACHLOROBIPHENYL RETENTION TIME CHECK

→ ALL RTs WITH-IN ESTABLISHED R.T. WINDOWS

• ANALYTE RESOLUTION CHECK - DB-1701 RESC49 01/18/96 10:47  
RTX-35 RESC63 02/05/96 14:22

→ ALL RESOLUTION BETWEEN  
TWO ADJACENT PEAKS >60%  
OF THE HEIGHT OF THE  
SMALLER PEAK

• FLORESIL CARTRIDGE CHECK - Lot # FLOF1589 - ALL RECOVERIES WITH-IN 80-120% R.C. LIMITS

• GPC CALIBRATION - GPC COLUMN: SX-3 - ALL RECOVERIES WITHIN 80-110% R.C. LIMITS

SMO Case No.: 0219

Contract Lab: IEA-CT

### III. INITIAL AND CONTINUING CALIBRATION CHECKS

Water: VOA NA SV NA PEST A  
Sed/Soil: VOA NA SV NA PEST A

- A - Acceptable - All criteria met.  
P - Provisional - Some criteria not met, data usable, see remarks.  
U - Unacceptable - Criteria not met, data unusable, see remarks.

#### REMARKS:

INITIAL - Instrument # HP5890 5B 01/18/96 → 01/19/96 - ALPHA BHC % RSD @ 23.3%, ALL OTHERS < 20%  
Instrument # HP5890 01A 02/05/96 → 02/06/96 - D-GUOMIN % RSD @ 22.3%, ENDOSULFAN II % RSD @ 22.5%; ALL OTHERS < 20%  
\*- ENDAM35 - RTX 35 (HP5890 01A) - 4.4' DET N/RSD @ 35%  
ALL OTHER PEM, ENDAM & ENDAM WITH % 0 ≤ 25%

### IV. BLANK ANALYSIS

Water: VOA NA SV NA PEST A  
Sed/Soil: VOA NA SV NA PEST A

- A - Acceptable - No contaminants above minimum detection limit, no interference with sample results, appropriate blank for each GC/MS system and extraction method.  
P - Provisional - Contaminants present but minimal interference with sample results.  
U - Unacceptable - Gross contamination, too much interference to use data for certain components or the entire fraction, appropriate blanks not analyzed.

- PBLK86 - HP5890 5B 02/17/96 11:28 (DB-1701)  
HP5890 01A 02/17/96 12:00 (RTX-35)

• NO DETECTIONS FOR ANALYTES IN THE BLANK ASSOCIATED WITH THESE SAMPLES

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## V. SURROGATE SPIKE RESULTS

~~Water: VOA SV PEST~~  
~~Sed/Soil: VOA NA SV NA PEST S~~

NOTE: Sample data flagged on individual basis.

## A. Individual sample flagging criteria.

Acceptable - All surrogate recoveries within criteria.  
Suspect - Any surrogate recoveries outside criteria and/or recoveries of <10% substantiated as a matrix effect.  
Invalid - Any recoveries of <10% that are unsubstantiated as a matrix effect.

	No. Samples	No. Suspect	No. Invalid
<del>Water: VOA</del>	<del>_____</del>	<del>_____</del>	<del>_____</del>
<del>SV</del>	<del>_____</del>	<del>_____</del>	<del>_____</del>
<del>PEST</del>	<del>_____</del>	<del>_____</del>	<del>_____</del>
Sed/Soil: VOA	_____	_____	_____
SV	_____	_____	_____
PEST	<u>7</u>	<u>1</u>	<u>0</u>

## B. Summary of Surrogates

A - Acceptable - <10% of samples reported as suspect.  
P - Provisional - >10% but <50% of samples reported as suspect.  
U - Unacceptable - >50% of samples reported as suspect and/or >10% samples reported as invalid.

## REMARKS:

DEACHLOROBIPHENYL OUTSIDE ADVISORY R.C. LIMITS OF 60-150% AT 701% ON RTX-35 COLUMN. Column #1 (DB-1701) RECOVERY ACCEPTABLE. NO QUALIFIERS FOR SURROGATE RECOVERIES. ALL OTHER RECOVERIES WITHIN ADVISORY R.C. LIMITS.

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## VI. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

## A. MATRIX SPIKE RESULTS:

~~Water:~~ VOA SV PEST SV  
Sed/Soil: VOA NA SV NA PEST A

NOTE: No action taken on Matrix Spike Results alone.

A - Acceptable - <10% of compounds outside criteria.  
P - Provisional - >10% but <50% of compounds outside criteria.  
U - Unacceptable - >50% of compounds outside criteria and/or >10% of compounds with recoveries of <10%.

	No. Compounds	No. Outside Criteria	No. <10% Recovery
<del>Water:</del>	<del>VOA</del>	<del>SV</del>	<del>PEST</del>
	<del>SV</del>	<del>SV</del>	<del>SV</del>
	<del>PEST</del>	<del>SV</del>	<del>SV</del>
Sed/Soil:	VOA	SV	PEST
	SV	SV	SV
(PCBs) PEST	2	0	0

## B. DUPLICATE RESULTS

~~Water:~~ VOA SV PEST SV  
Sed/Soil: VOA NA SV NA PEST SV

A - Acceptable - <10% of compounds outside criteria.  
P - Provisional - >10% but <50% of compounds outside criteria.  
U - Unacceptable - >50% of compounds outside criteria and/or >10% of compounds with recoveries of <10%.

	No. Compounds	No. Outside Criteria
<del>Water:</del>	<del>VOA</del>	<del>SV</del>
	<del>SV</del>	<del>SV</del>
	<del>PEST</del>	<del>SV</del>
Sed/Soil:	VOA	SV
	SV	SV
(PCBs) PEST	2	0

REMARKS:

— ALL RECOVERIES AND LPDs (?) WITHIN A.C. LIMITS,  
SAMPLES SPIKED WITH AMOCLOLS 1242 & 1260,

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## VII. FIELD DUPLICATES

Water: VOA SV PEST  
Sed/Soil: VOA NA SV NA PEST NA

A - Acceptable - All compounds are within 25% of each other for waters or within 50% of each other for soils.

P - Provisional - Some compounds are greater than 25% RPD for waters and greater than 50% RPD for soils, see remarks.

U - Unacceptable - Professional judgement, see remarks.

## REMARKS:

- Not Applicable - No field duplicates submitted for analyses.



SMO Case No.: 0219

Contract Lab: IEA-CT

VIII. INTERNAL STANDARD PERFORMANCE

~~Water:~~ VOA ~~SV~~ ~~PEST~~  
Sed/Soil: VOA NA SV NA PEST NA

- A - Acceptable - Is area counts between - 50% to +100% from associated calibration standard and  $\pm 30$  seconds from associated calibration standards.
- P - Provisional - Most all area counts between -50% to +100% and  $\pm 30$  seconds, from associated calibration standard, see remarks.
- U - Unacceptable - Extremely low area counts or major abrupt drop-off of sensitivity or greater than  $\pm 30$  second time shift, see remarks.

REMARKS:

- PCBs - NOT APPLICABLE

IX. COMPOUND IDENTIFICATION

~~Water:~~ VOA ~~SV~~ ~~PEST~~  
Sed/Soil: VOA NA SV NA PEST A

- A - Acceptable - All compounds within retention time windows, spectral criteria met.
- P - Provisional - Some criteria not met, data usable, see remarks.
- U - Unacceptable - Criteria not met, data unusable, see remarks.

REMARKS:

PCBs - PCBs REPORTED BY PATTERN RECOGNITION WITH STANDARDS (AROCLONS 1216, 1221, 1232, 1242, 1248, 1254 AND 1260).

NOTE: AROCLORS WEREN'T RUN WITHIN 72 HOURS OF THEIR DETECTION IN SAMPLE ACS-56150-SS3 6-8'. THESE WERE FOR PATTERN RECOGNITION ONLY AND THE DATA WAS NOT AFFECTED.

SMO Case No.: 0219Contract Lab: IEA-CT

## X. COMPOUND QUANTIFICATION AND REPORTED D.L.

Water:	VOA	SV	PEST
Sed/Soil:	VOA <u>NA</u>	SV <u>NA</u>	PEST <u>A</u>

- A - Acceptable - Compounds were quantified, as well as the adjustment of the CRQL, was calculated according for the SOW or SAS.
- P - Provisional - Some criteria not met, data usable, see remarks.
- U - Unacceptable - Gross problems, interferences, unacceptable RT and RRF shifts, see remarks.

## REMARKS:

PCBs - Compound Quantification - MULTIPEAK QUANTITATION - ACCEPTABLE  
DETECTION LIMITS PROPERLY ADJUSTED FOR PERCENT MOISTURE.

## XI. SYSTEM PERFORMANCE

Water:	VOA	SV	PEST
Sed/Soil:	VOA <u>NA</u>	SV <u>NA</u>	PEST <u>A</u>

- A - Acceptable - No indication of instrument problems such as baseline shifts, I.S. absolute area changes, etc.
- P - Provisional - Indication of minor problems, see remarks.
- U - Unacceptable - Indication of instrument problems, see remarks.

## REMARKS:

- SYSTEM PERFORMANCE ACCEPTABLE

NOTE: AROCLORS WERE NOT RUN WITHIN 72 HOURS OF THEIR DETECTION IN SAMPLE 150553 6/8. THESE WERE FOR PATTERN RECOGNITION ONLY AND THE DATA WAS NOT AFFECTED.

1/21/96

ACS

4077.0076

SNO CASE # 0219

SEVEN SOILS WERE ANALYZED FOR PCBs BY IEA-CT ON 2/17/96. ALL SAMPLES WERE EXTRACTED AND ANALYZED WITH-IN HOLDING TIMES. SAMPLES WERE ANALYZED BY EC-GC. INSTRUMENT PERFORMANCE WAS ACCEPTABLE. PESTICIDE RESIDUE DATA WAS REVIEWED TO CONFIRM GC PERFORMANCE. MOST CRITERIA WERE MET WITH THE EXCEPTION OF 4,4' DDT ON COLUMN RTX-35 (INSTRUMENT # HP5890 01A) IN THE INDIVIDUAL MIX AT MEDIUM LEVEL. THE RELATIVE PERCENT DIFFERENCE FROM THE INITIAL CALIBRATION WAS @ 35%, OUTSIDE THE LIMIT OF 25%. SINCE SAMPLES WERE ANALYZED FOR PCBs ONLY, THE DATA WAS NOT AFFECTED. SUMMATE DECACHLOROBIPHENYL OUTSIDE ADVISORY R.C. LIMITS OF 60-150% AT 701% ON RTX-35 COLUMN FOR SAMPLE 151555 9/11. DECACHLOROBIPHENYL RECOVERY ACCEPTABLE ON DB-1701 COLUMN FOR THIS STAY. ALL OTHER RECOVERIES WITH-IN ADVISORY R.C. LIMITS. AROLLORS WERE NOT RUN WITHIN 72 HOURS OF THEIR DETECTION IN SAMPLE 150553 6/8. THESE WERE FOR PATTERN RECOGNITION ONLY (NOT QUANTITATION) THEREFORE, DATA WAS NOT AFFECTED. NO OTHER CHANGERS OR PROBLEMS WITH THE DATA OCCURRED.

MARK PAULI  
MONTGOMERY WATSON

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TECHNICAL MEMORANDUM  
DEWATERING/BARRIER WALL ALIGNMENT  
INVESTIGATION REPORT

AMERICAN CHEMICAL SERVICE, INC.  
NPL SITE  
GRIFFITH, INDIANA

---

*PREPARED FOR:*  
ACS RD/RA EXECUTIVE COMMITTEE

• • •  
*PREPARED BY:*  
MONTGOMERY WATSON  
*ADDISON, ILLINOIS*

AUGUST 1996



**MONTGOMERY WATSON**

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## INTRODUCTION

### 1.1 OBJECTIVES

This Technical Memorandum summarizes the results of investigation activities conducted to delineate the alignment and support the design of the dewatering/barrier wall at the ACS NPL site in Griffith, Indiana. The purpose of the dewatering/barrier wall is to prevent migration of contaminants from the Still Bottoms/Treatment Lagoon and Off-Site Containment Area (OSCA) to the site boundary. The dewatering/barrier wall investigation was performed in accordance with the January 12, 1996 Dewatering/Barrier Wall Alignment Pre-Design Work Plan approved by U.S. EPA and IDEM. It was originally proposed to install two separate barrier walls, one for the Still Bottoms/Treatment Lagoon Area, the other for the Off-Site Containment Area. Data were collected and evaluated for the investigation to accomplish the following objectives:

- Determine the lateral extent of waste materials at the locations where the barrier wall alignment is proposed. (According to the ROD, wastes are classified as soils with total VOC concentrations of 10,000 ppm (1 percent) or greater, and/or PCB concentrations of 10 ppm or greater.)
- Collect field and laboratory geotechnical information to support the design and construction of the barrier wall.
- Define the elevation of the top of the clay confining layer along the barrier wall alignment.
- Collect soil samples for potential mix design testing of a soil-bentonite barrier wall.
- Collect groundwater samples for potential compatibility testing of the proposed barrier wall.
- Provide sufficient information regarding site conditions to barrier wall subcontractors intending to propose and bid on barrier wall technology and design.

Samples of soil and groundwater were collected for soil-bentonite wall mix and compatibility testing. The soil-bentonite design and compatibility testing will be performed by the barrier wall subcontractor during barrier wall final design if a soil-bentonite mix design as needed to complete the technology selection process.



## 1.2 SCOPE OF WORK

Field investigations for the barrier wall alignment generally consisted of drilling soil borings extending to the underlying clay confining layer along the proposed alignment of the barrier walls, and assessing the presence of waste materials through visual inspections and field and laboratory analyses of selected soil samples. If material was found that met or exceeded the criteria for "waste", additional borings were conducted outward from the waste area to determine the extent of waste materials.

Field analysis of soil samples consisted of using field test kits for analysis of PCBs, a field gas chromatograph (GC) for analysis of total VOCs (defined as the sum total of the concentrations of detected target VOCs), and hydrophobic dye to test for the presence of free-phase materials. Duplicate soil samples were submitted to the laboratory for analysis when field analysis indicated VOC concentrations greater than 8,000 ppm or PCB concentrations approaching or exceeding 10 ppm.

Representative soil samples for geotechnical analyses were collected from borings located along the barrier wall final alignment and submitted to the laboratory for grain size analysis and hydraulic conductivity/permeability testing.

Soil borings were drilled during the barrier wall investigation to gather geotechnical information to design Pilot Test Cells in the Still Bottoms/Treatment Lagoon Area and the Off-Site Containment Area. Information gathered during the test cell soil borings included standard penetration testing, field soil classification and the depth to the clay confining layer. Field and laboratory analyses were not performed on soil samples collected from these areas.

## PROCEDURES

### 2.1 DRILLING

A total of 23 soil borings were advanced in the Off-Site Containment Area (SB201 through SB223) and 48 soil borings were drilled in Still Bottoms/Treatment Lagoon Area (SB101 through SB144 and SB149 through SB152). The locations of the soil borings are shown in Figure 1. Soil boring location coordinates, ground surface elevations, and depth to the clay confining layer are presented in Table 1. Work was conducted following the SOW and SOPs approved by the U.S. EPA on January 12, 1996.

The intervals between soil boring locations ranged from 25 feet in the area south of the fire pond area to approximately 200 feet along the eastern perimeter (Figure 1). In general, locations were more closely spaced in areas where detailed information was required regarding the extent of waste materials. Ground surface elevations, and northing and easting coordinates were surveyed to the nearest 0.1 foot for each boring by Area Survey of Orland Park, Illinois. The survey report for the barrier wall investigation is presented in Appendix A.

Soil borings were advanced approximately two feet into the top of the clay confining layer and logged by a geologist at both areas of the site. The depth to clay and elevation of the top of clay for all soil boring locations are also included in Table 1. The elevation of the top of the clay confining layer ranged from approximately 617 feet to 622 mean sea level (msl) feet throughout the site area. Soil boring logs for borings located along the proposed final alignment are presented in Appendix B1. Pilot test cell soil borings are presented in Appendix B2. Remaining soil boring logs (borings not along the final alignment) are presented in Appendix B3.

Two drilling rigs were utilized concurrently to advance soil borings in the Still Bottoms/Treatment Lagoon Area and Off-Site Containment Area during the field investigation. An all-terrain vehicle (ATV) mounted drill rig was used to access the soil borings in the Off-Site Containment Area, whereas a truck-mounted rig was used in the Still Bottoms/Treatment Lagoon Area. All borings were drilled with 3.25-inch inside diameter (I.D.) hollow stem augers. Following completion of the borings, the boreholes were backfilled to the ground surface using a bentonite-cement grout. Soil boring locations were subsequently surveyed by Area Survey (Appendix A).

Soil boring and sample collection were conducted in accordance with the U.S. EPA and IDEM approved, January 12, 1996 Dewatering/Barrier Wall Alignment Pre-Design Work Plan and the Specific Operating Procedure (SOP) for drilling and soil sampling, with the following exceptions:

- Soil borings SB109 through SB113, SB134 through SB136, and SB150 through SB152 in the Still Bottoms/Treatment Lagoon Area and borings SB206, SB212, SB215, SB217, and SB221 in the Off-Site Containment Area were continuously sampled (i.e., 1 to 3 ft, 3 to 5 ft, etc.) to the bottom of each boring in order to collect additional soil volume for geotechnical laboratory analyses.

## **2.2 SAMPLE COLLECTION**

Soil samples were collected from borings for field and laboratory analyses. Samples were collected in the field according to the following strategy outlined in the Dewatering/Barrier Wall Alignment Pre-Design Work Plan:

- One to two soil samples per boring were collected based on visual observations, (i.e., black or brown staining, presence of free phase material) for PCB field screening using an Ohmicron Environmental Diagnostics Rapid Assay Soil Test.
- One to two soil samples per boring were selected based on visual observations and PID readings for VOC analyses with the field GC.
- One soil sample per boring, located at the interface of the sand and clay confining layer, was collected and analyzed for the presence of free phase material utilizing the hydrophobic dye testing technique.
- Four 30-inch long, 3-inch diameter Shelby tube samples were collected from the areas (two from the Off-Site Containment Area and two from the Still Bottoms/Treatment Lagoon Area). The Shelby tube samples were collected from borings located along the proposed final alignment and one sample from each Shelby tube was analyzed for permeability using the falling head method.
- Twenty-two soil samples (from 11 borings) were collected along the proposed final alignment and analyzed for grain size distribution (ASTM D422).

## SAMPLE ANALYSIS

Screening methods were used to select samples in the field, for submittal to the off-site laboratory for analysis. The field screening process followed a sequence. First samples were evaluated using the field PID and visual observation to identify the zones of soil most likely to be highly contaminated. Next samples were selected from the zones appearing to be most contaminated, and evaluated by one or more of three field methods: 1) field evaluation for PCBs using the Ohmicron Environmental Diagnostics Rapid Assay Soil Test, 2) Field GC analysis to evaluate VOC concentrations, and/or 3) hydrophobic dye testing to identify free-phase oil in the samples. In some borings, all three analyses were conducted on a material from a single soil zone. On other borings, each analysis was conducted on a different soil zone.

The results of the three field screening technologies were used to select samples for laboratory analysis for VOCs and PCBs. The most representative sample volumes were submitted for each analysis. Because of this sequence, there was not always an exact correlation between highest PID reading, highest field GC indication, and highest laboratory results. The most highly contaminated material, on the basis of the field screening methods, was used for the field analysis.

### 3.1 PCB ANALYSIS

Soil samples were analyzed for PCB field screening using the Ohmicron Environmental Diagnostics Rapid Assay Soil Test according to the User's Guide presented in the approved Dewatering/Barrier Wall Alignment Pre-Design Work Plan. Montgomery Watson field personnel were trained in the use and application of the method by an Ohmicron representative prior to starting the sampling analysis. The following exceptions occurred to the Work Plan:

- A dilution of five was used in Step 46 of the flow diagram (provided in the Barrier Wall Investigation Work Plan) rather than a dilution of twenty. The one to five dilution was used to achieve the 10 ppm cutoff (waste criteria) for PCBs in soil.
- No soil samples were selected for field PCB analysis from soil boring SB201 due to auger refusal at a depth of 8 ft (See boring log for SB201 in Appendix B1). Soil boring SB210 was used as a replacement for SB201.

Field screening results from the soil samples and proficiency samples analyzed are presented in Appendix C.

### **3.2 FIELD GC ANALYSIS**

Soil samples were analyzed for target VOCs using the field GC in accordance with the approved SOP with the following exceptions:

- Due to the high concentration of target VOCs in the soils, samples were run at a five-to-one dilution. Detection limits are subsequently five-times higher than the proposed limits.
- No soil samples were analyzed for VOCs from soil boring SB201 due to auger refusal at a depth of 8 ft (See boring log for SB201 in Appendix B2). ). Soil boring SB210 was used as a replacement for SB201.

Tabulated field GC screening results from each sample analyzed are presented in Appendix D.

### **3.3 LABORATORY ANALYSIS**

Soil samples which indicated VOC concentration greater than 8,000 ppm from the field GC analytical results, or PCB concentrations close to 10 ppm from the Ohmicron Rapid Assay Soil Field Test kit were sent to IEA Analytical Laboratories in Cary, North Carolina for confirmatory analyses in accordance with the Contract Laboratory Program (CLP) Statement of Work.

A summary of the analytical laboratory results and comparison to the field GC and PCB test kits are presented in Table 2. The complete IEA Laboratory report is presented in Appendix E.

### **3.4 GEOTECHNICAL LABORATORY ANALYSIS**

Geotechnical laboratory analysis performed at CGC, Inc. of Madison, Wisconsin included: grain size distribution (ASTM D422) for granular, Atterberg limits (liquid limit and plasticity index) (ASTM D4318), grain size distribution (ASTM D422), and flexible-wall permeability tests (ASTM D5084) for samples from the clay confining layer. Rigid-wall falling head permeability testing was performed on four Shelby tube samples of the confining clay layer.

Geotechnical laboratory testing for the soil-bentonite mix design and compatibility testing was not performed at this time. As previously stated, these tests will be performed by our

construction subcontractor, as necessary, to select a soil-bentonite mix for sections of the barrier wall to be constructed as a bentonite slurry wall.

Geotechnical analyses of selected soil samples were conducted in accordance with the Dewatering/Barrier Wall Alignment Pre-Design Work Plan, with the following exceptions:

- Soil samples collected for grain size analysis along the proposed final alignment were analyzed at intervals greater than 200 feet. Because the original 200-foot spacing of soil samples for grain size analysis was based on a shorter length of alignment, increasing the proposed alignment length served to extend the distance between samples. Due to the consistent geology over the entire site, little variation in grain size was noted between borings located more than 200 feet apart (see Section 7). Soil samples were collected from all borings conducted during the investigation and are currently being stored. These soil samples will be available for additional grain size analyses in the future, if necessary.
- A flexible-wall hydraulic conductivity/permeability test (ASTM D5084) was not performed on the one of the four clay confining layers samples (SB206) because there was insufficient volume of the undisturbed Shelby tube sample.
- In addition to the flexible-wall hydraulic conductivity/permeability testing, rigid-wall falling head permeability testing (U.S. Army Corps of Engineers Method EM 1110-2-1906 (VII)) was performed on the four Shelby tube samples. The U.S. Army Corps rigid wall falling head permeability test method was performed in order to model the worse case existing soil conditions of the clay confining layer at ACS.

## BARRIER WALL ALIGNMENT

### 4.1 PROPOSED FINAL ALIGNMENT

The proposed final alignment of the Dewatering/Barrier Wall is presented in Figure 2. The objective of the field investigation was to evaluate the suitability of the proposed barrier wall alignments. The approved Work Plan included a method to move the barrier wall alignment outward at locations where waste conditions were identified in the subsurface. Therefore, the final wall alignment was based on the preliminary estimate of location, modified by the field and laboratory analysis of soil samples for VOCs and PCBs.

### 4.2 STILL BOTTOMS/TREATMENT LAGOON

#### 4.2.1 North Alignment

At the request of the American Chemical Service Company, a revised alignment for the north section of the Barrier Wall was proposed to the U.S. EPA on July 30, 1996, after the completion of the first draft of this Technical Memorandum. The U.S. EPA approved the revised alignment (see Section 4.4) in a letter dated August 12, 1996. The remainder of Section 4.2.1 is important information regarding the site, so it will not be deleted from this Technical Memorandum. However, it no longer is relevant to the discussion of the Barrier Wall Alignment.

PCBs were detected greater than 10 ppm in soil borings SB112 and SB125 by field screening tests (Appendix C). This required the proposed alignment to be moved outward, further to the north. Soil borings SB127 and SB142 were advanced to the north of SB112 and SB125, respectively. No exceedences of waste criteria for PCBs (10 ppm) or total VOCs (10,000 ppm) were observed in soil samples analyzed in the field from soil boring SB142.

Field screening for PCBs in a soil sample collected from SB127 at a depth of 6 to 8 ft did not indicate an exceedence of the waste criteria (8.5 ppm). However, a duplicate sample sent to IEA for confirmatory analyses indicated a total PCB concentration of 44 ppm. The next deeper zone, from the 8 to 10 foot depth was also field-tested for PCBs but none were detected. On the basis of all the sampling results along the north alignment, the PCB exceedance at SB127 is considered a localized condition. Furthermore, there is an above ground liquid nitrogen storage tank and several other tanks located just to the north of the SB127 so it is not feasible to move the alignment north around a localized area. The soil

cuttings generated during any excavation for barrier wall construction in the vicinity of SB127 will be managed stored on site for future remediation.

#### **4.2.2 West Alignment**

Exceedences of PCBs (>10 ppm) were found in soil samples collected from soil borings SB122 and SB137, requiring the west portion of the alignment to be moved further to the west. PCBs were not detected greater than the waste criteria in soil samples collected from soil boring SB141, located approximately 26 ft west of soil boring SB137 (Figure 1). Therefore, the final alignment was oriented through this boring location. Additional soil samples collected along the revised alignment soil borings (SB140, SB136, SB139 and SB131) did not indicate PCB concentrations greater than 10 ppm.

#### **4.2.3 Railroad Spur Area**

Soil borings advanced at 25-foot intervals along the railroad spur indicated potential exceedences of PCBs with field screening (>10ppm) in soil samples collected from soil borings SB101, SB103, SB105, SB107, and SB108. These potential exceedences required that the southern section of the proposed barrier wall be moved further south. Soil boring SB120 was advanced approximately 100 feet south of soil boring SB105, near a building located immediately south of the railroad spur (Figure 1). Because PCBs were detected in SB120 greater than 50 ppm with field screening, the final alignment was moved further south.

A new potential alignment, 50 feet farther to the south from SB120, was selected for sampling and proposed to U.S. EPA. U.S. EPA approved the revised location, and a series of borings (SB129 through SB135) were made along the fence line marking the south boundary of the ACS facility (Figures 1 and 2). Field screening results suggested PCBs were present in soil borings SB129, SB134 and SB135 greater than 10 ppm, and positive results from the hydrophobic dye test were noted in soil samples collected at the sand/clay confining layer interface in soil boring SB134 (19 to 21 ft). The positive dye test results indicated the presence of free phase material at these locations.

Soil boring SB138 was advanced south of soil boring SB134, near the fence boundary of the ACS facility. PCBs were detected with field screening at 26.8 ppm in the 18.5 to 20.5 ft sample interval, indicating an exceedance of the "waste" criteria. The hydrophobic dye test from the same interval also indicated the presence of free phase material in this sample.

#### **4.2.4 Additional Soil Borings - Proposed Final Alignment**

The results of borings SB129 through SB135, and SB138 suggested that oil and PCB containing soil extended at least to the south ACS property line. Therefore, Montgomery Watson proposed to the U.S. EPA that borings be conducted for the consideration of connecting the two barrier walls into a single wall encompassing both the Still Bottoms/Treatment Lagoon Area and the Off-Site Containment Areas. U.S. EPA approved the proposal, and new borings were made farther to the east along Colfax.



Soil boring SB149 was advanced approximately 125 feet east of soil boring SB142, along the north side of the proposed final alignment. Soil borings SB150, SB151, and SB152 were advanced at 200 feet (approximate) intervals along the east alignment within the ACS facility boundaries.

### 4.3 OFF-SITE CONTAINMENT AREA

The proposed barrier wall alignment in the Off-Site Containment Area is relatively unchanged from the alignment presented in the Dewatering/Barrier Wall Alignment Pre-Design Work Plan. Some minor alignment modifications were made based on the soil boring program and results of field and laboratory samples. Because the refuse and void spaces would limit construction of a barrier wall in this area, additional construction activities may be necessary prior to implementation. Twenty-three boring locations were originally planned and staked around the Still Bottom Pond in the Off-Site Area. The borings were spaced 50 feet apart along the southwestern side, adjacent to the Griffith Landfill, and 200 feet apart around the rest of the area. The closer spacing was planned because previous investigations indicated the probable presence of landfill waste along the southwest side of the Off-Site Area.

Refuse and fill material was encountered in soil borings SB201 through SB210, from near the ground surface, to depths of approximately 17 feet below ground surface. This was consistent with information from previous investigations which indicated that refuse has been buried over much of the southern part of the Off-Site Area.

The PCB waste criterion was not exceeded at any of the boring locations. The waste criterion was exceeded at one sample location, SB205, located along the southwest border of the Off-Site Area. The field GC indicated a concentration of 111,639 ppm total VOCs in the 3.5 to 5.5 foot sample interval. In accordance with the approved Scope of Work, a second boring, SB205A, was made outward, approximately 40 feet west of SB205.

The SB205A location was outside the Off-Site Area fence, in the center of the Griffith Landfill perimeter road. The sampling results did not indicate any exceedences of the waste criteria, however, the boring indicated that virtually the entire soil profile consists of buried municipal landfill refuse. Buried refuse was encountered from a depth of approximately 2 feet, to a depth of 17 feet, just three feet above the confining clay layer. Clearly, moving the barrier wall alignment outward into the Griffith Town Landfill is not a viable solution. Nor would moving the alignment to the east, further into the Off-Site Containment Area be viable, since previous investigations indicate buried waste there too.

The most viable location for the final barrier wall alignment will be through the locations of SB201 to SB210. The boring logs show that there are variable thicknesses of refuse along this alignment. But the waste is generally found above the static water table. Refuse and the associated void spaces would limit the constructability of a barrier wall in this area. A possible solution will be to excavate a trench to the base of the refuse along this portion of

the alignment. After removal of the refuse, soils would be brought in to backfill the trench. The proposed final barrier wall would then be constructed through the imported soil. There may be other solutions to the refuse issue, the actual method will be determined in the 100% design.

#### **4.4 REVISED BARRIER WALL ALIGNMENT**

After further review of the potential impacts to their process line, American Chemical Service, Inc. (ACS, Inc.) requested a new alignment be developed that goes north of all their active process lines, rather than cut between two of them. The revised alignment extends the barrier wall an additional 200 feet to the north from the proposed final alignment.

Twenty-six new geotechnical borings for were performed by Horizontal Technologies Inc., to confirm the results from the proposed barrier wall alignment and to evaluate the conditions along the revised alignment. The revised alignment was proposed to the U.S. EPA in a letter dated July 30, 1996. The letter contained a map of the proposed alignment and the logs of 26 new test borings. U.S. EPA approved the revised alignment in a letter dated August 12, 1996. Figure 2 shows the revised alignment.

It is possible that some areas of waste will remain outside the barrier wall. To the extent that such areas do exist, they will be addressed by the overall site remedy.

## CROSS SECTIONS OF PRELIMINARY FINAL ALIGNMENT

A location map of cross sections through the preliminary final alignment is presented in Figure 3. Figure 4 shows the cross sections through the north alignment (soil borings SB115 through SB151), and the east alignment (soil borings SB151 through SB213). Figure 5 represents the cross section of the west alignment (soil borings SB115 to SB208). Soil boring logs used for cross sections along the preliminary final alignment are presented in Appendix B1. (All other boring logs for the barrier wall alignment investigation are presented in Appendix B3.)

As shown by the cross sections, the geology of the alignment is generally uniform, consisting of fine to coarse sand with some silt and clay overlying a clay confining layer. Soil borings SB151 and SB152, located along Colfax Avenue, contained more sand and gravel than typically observed throughout the site. The depth to clay varied primarily on the basis of ground surface elevation. The clay surface was typically observed to be at an elevation of 617 feet to 622 feet msl. The elevation of the top of clay is consistent with the findings of the Remedial Investigation (RI). The average groundwater elevation of 635 feet above msl along the north (A-A') and east (B-B') cross-section lines, and 634 feet above msl on the west (C-C') cross-section line, is based on groundwater elevation data compiled during the RI from August 17, 1989 to September 13, 1990. The RI data were used to estimate an average water level occurring over a period of time in the late summer and early fall at the site .

The final barrier wall alignment has been revised, moving approximately 200 feet to the north. Additional geotechnical borings were performed by Horizontal Technologies Inc. and the drilling company, Boart Longyear to confirm the results from the Barrier Wall Alignment Technical Memorandum. U.S. EPA approved the revised alignment in a letter dated August 12, 1996.

## ANALYTICAL RESULTS ALONG THE PROPOSED FINAL ALIGNMENT

### 6.1 PCBs

Field and laboratory PCB results for soil samples collected from borings located along the final alignment are summarized on Table 2. Field screening results and proficiency samples are included in Appendix C. Laboratory analytical reports are presented in Appendix E.

Along the proposed barrier wall final alignment in the Still Bottoms/Treatment Lagoon Area (i.e., 100-series borings), 33 soil samples were collected and analyzed for PCBs using the Ohmicron field test kit. PCBs were detected greater than 10 ppm in 10 of the soil samples analyzed with the test kits collected from the following soil borings: SB113, SB143, SB149, SB150, SB151 and SB152. All of the soil samples which exceeded the 10 ppm waste criteria, as well as two samples near the 10 ppm cutoff level (SB124, 8.5 to 10.5 feet, and SB127, 6 to 8 feet) were submitted to IEA Laboratory for confirmatory PCB analysis.

Of the twelve confirmatory soil samples submitted to the laboratory for PCB analysis, only one soil sample exhibited PCB concentrations greater than 10 ppm (Table 2). PCBs were detected in the 6 to 8 foot soil sample collected from soil boring SB127 at 44 ppm, whereas field results for the same sample indicated PCB concentrations at 8.5 ppm.

A total of 34 soil samples from the Off-Site Containment Area portion of the proposed final alignment (200-series borings) were analyzed with the field test kit. Only one sample, SB214 at 13.5 to 15.5 feet, indicated PCBs above the waste criteria (10.6 ppm). This sample was subsequently sent to IEA for confirmatory analysis. The results indicated the presence of PCBs at a concentration of 2.7 ppm, below waste criteria (Table 2).

### 6.2 VOCs

Field and laboratory VOC results for soil samples collected from borings located along the final alignment are summarized on Table 2. Field GC results are included in Appendix D. Laboratory analytical reports from IEA are presented in Appendix E.

A total of 23 soil samples from Still Bottoms/Treatment Lagoon Area portion of the proposed final alignment were analyzed with the field GC (Table 2). The field results

indicated only one soil sample, SB143 6 to 8 feet, had a total VOC concentrations (11,583 ppm) greater than 10,000 ppm waste criteria. A sample from the same split spoon was subsequently submitted to IEA for confirmatory analysis. Results from the lab analysis indicated a total VOC concentration of 0.76 ppm. One other sample from soil boring SB142 (6 to 8 feet) was also submitted for laboratory analysis, although the field-determined VOC concentration was less than criteria set forth in the Dewatering/Barrier Wall Alignment Pre-Design Work Plan (5,168 ppm). Results from this sample indicated a total VOC concentration of 335 ppm.

A total of 35 soil samples from Off-Site Containment Area portion of the proposed final alignment were analyzed with the field GC (Table 2). A soil sample from soil boring SB205 exceeded the 10,000 ppm waste criteria for total VOCs. Confirmation samples were not submitted immediately from this soil boring because of anticipation of moving the barrier wall alignment toward a second boring drilled approximately 40 feet west from this location at SB205A. Upon discovery of landfill refuse at SB205A, the alignment of the barrier wall shifted back to SB205 and the holding time for VOC analysis had elapsed. As discussed in Section 4.3, the area around SB205 will be addressed in the 100% design.

Field GC analyses did not show VOCs greater than 8,000 ppm in any other soil samples from the Off-Site Containment Area; therefore, no soil samples were submitted to the laboratory for confirmation analysis.

## GEOTECHNICAL RESULTS

The geotechnical laboratory results performed on selected soil samples are summarized on Table 3. The laboratory reports are presented in Appendix F.

The granular soils above the clay confining layer are generally classified as a fine to coarse sand with a trace to some silt and clay, and have the Unified Soil Classification System (USCS) symbols of SP, SP-SM, and SM. The clay confining layer is generally classified as clay with a USCS symbol of CL.

According to the rigid-wall falling head permeability testing (U.S. Army Corps of Engineers Method EM 1110-2-1906 (VII)), the permeability of the clay confining layer ranged from  $1.7 \times 10^{-8}$  cm/s (centimeters per second) to  $2.4 \times 10^{-8}$  cm/s based on relatively undisturbed Shelby tube samples. Liquid and plasticity limits ranged from 28-30% and 11-14%, respectively (Table 3).

The results of the flexible-wall hydraulic conductivity/permeability tests (ASTM D5084) for SB109 and SB151 show the permeability of the clay confining layer to be  $2.0 \times 10^{-8}$  cm/sec and  $2.4 \times 10^{-8}$ , respectively. These data are consistent with the permeability values calculated from the falling head method. The result for sample SB212, using the flexible wall method, is two orders of magnitude greater than the result from the falling head method (Table 3). The sample used for the flexible wall method was observed to be more silty than the sample used for the falling head method.

## PILOT TEST CELL BORINGS

In accordance with the expedited Pre-Design Work Plan, sheet piling will be used to construct two small test cells for conducting pilot studies. One test cell will be constructed in the waste in the Still Bottoms/Treatment Lagoon area on the ACS site, and the other will be constructed in the waste area in the Off-Site Containment Area. Four soil borings were made at each location to evaluate the subsurface conditions and aid in the design of the test cells. Soil borings, SB145 through SB148, were advanced approximately two feet into the clay confining layer in the Still Bottoms/Treatment Lagoon Area and soil borings (SB224 through SB227) were advanced in the Off-Site Containment Area for the pilot test cell locations. The locations of the pilot test cells and borings are presented in Figure 6. Soil boring logs for the Pilot Test Cell borings are presented in Appendix B2.

Based on Standard Penetration Tests (i.e., blow counts), conducted during boring installation (ASTM D1586), the soil materials at both pilot cell locations was classified as loose to medium dense granular soils. Field lithologic logging identified the soils at the Still Bottoms/Treatment Lagoon Area pilot test cell plots as fine to coarse sands with little silt, and generally fine sands and fill material in the Off-Site Containment Area.

Both locations for test cells were selected to be in known waste areas. As expected, some obstructions were encountered during the boring program at both locations. In the Still Bottoms/Treatment Lagoon area, several 1.5 foot thick concrete slabs were encountered one to two feet below the ground surface. As a result of the auger refusal, the borings were moved to the east from the originally planned location. Figure 6 shows the location of the borings that were made to the clay confining layer. In the Off-Site Containment area, several partially-intact metal objects (5 gallon containers and possible drums) were observed in the fill material generally 5 to 8 feet below ground surface.

## SCHEDULE FOR BARRIER WALL CONSTRUCTION

A milestone and deliverable date schedule for barrier wall construction is presented in Table 4. The schedule is based on assumed review times by the U.S. EPA. Concurrent with submittal of this Technical Memorandum to the U.S. EPA, an RFP will be submitted to subcontractors soliciting proposals for barrier wall construction technologies.

Following U.S. EPA approval of the proposed barrier wall alignment, the design of the barrier wall systems will commence. The barrier wall systems include the barrier wall, the groundwater extraction systems, and the performance monitoring system. In addition, the design of the test cells to be used for the SVE and material handling/low temperature thermal desorption pilot tests will be included with the barrier wall systems. A 50 Percent Design and 100 Percent Design will be submitted to U.S. EPA and IDEM for review. As discussed with and approved by the U.S. EPA, the 50 Percent and 100 Percent design documents will meet the requirements for the 30, 60 and 95 Percent design submittals included in the SOW.

The 50 Percent Design document will be submitted once the barrier wall technology and contractor have been selected. That selection is expected to be made on June 19, 1996. The submittal will include the following:

1. A draft of the design basis for all the systems listed above. The design basis will provide a brief description of the design criteria, rationale for major decisions, major equipment, permits/approvals required, effects on groundwater flow patterns, operational procedures, and management of waste and residuals. The design basis will not be complete at this stage since many aspects of the designs will not be resolved or finalized.
2. Barrier Wall Design
  - The performance specification used to solicit contractor bids
  - Drawings showing the final alignment and cross sections
  - A Technical Memorandum presenting the selected barrier wall technology (this will actually be part of the design basis)
3. Extraction System Design
  - A plan drawing showing the layout of the extraction systems
  - A plan drawing showing the conveyance piping
  - Draft details of the extraction wells/trenches



4. Performance Monitoring System Design
  - A draft of the Performance Standard Verification Plan (PSVP)
  - A plan drawing showing the location of the monitoring wells/piezometers
5. Test Cell Design
  - A draft of the specification for the test cells
  - A plan drawings of the test cell
  - A geologic cross-section (if needed)
  - Draft details of the sheet pile construction
6. A draft Health and Safety Plan for the construction
7. A draft Construction Quality Assurance Plan (CQAP)
8. Preliminary Construction Schedule
  - Pre-construction meeting
  - Site preparation and/or workbench construction
  - Start of construction
  - Completion of construction
  - Site restoration

The 100 Percent Design document will incorporate comments on the 50 Percent Design as well as the finalized designs of the various systems and associated plans. Specifically, the submittal will include the following:

1. The final design basis for the various systems
2. Barrier Wall Design
  - The final design drawings
3. Extraction System Design
  - Final drawings of the extraction wells/trenches, sump or wellhead completions, conveyance piping and tie-ins to the treatment system, and electrical power supply and instrumentation.
4. Performance Monitoring System Design
  - Final drawings showing the locations and construction details for the piezometers/monitoring wells.
  - The final PSVP including the sampling program, a QAPP addendum, and a Health and Safety Plan addendum.
5. Test Cell Design
  - Final design drawings for the test cell layout, location, and construction details
  - A performance specification for dewatering the test cell

6. The final Health and Safety Plan
7. The final CQAP
8. Detailed Construction Schedule
  - Pre-construction meeting
  - Site preparation and/or workbench construction
  - Start of construction
  - Completion of construction
  - Site restoration

The final design of the barrier wall will incorporate all known underground and overhead utilities, pipelines, sewers and drains in the area. Figure 7 shows the final alignment of the wall and all known potentially affected utilities in the vicinity of the ACS facility. Based on deliverable dates established on a milestone basis, the construction of the barrier wall will be completed by February 28, 1997 (Table 4).

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**Table 1**  
**Soil Boring Location and Elevation Information**  
**American Chemical Service, Inc.**  
**Barrier Wall Investigation**  
**On-Site Containment Area**

Boring Number	Coordinates		Ground Elevation (msl)	Depth To Clay (ft)	Clay Elevation (msl)
	Northing	Easting			
SB-101	6892.9	5253.7	637.9	19.5	618.4
SB-102	6873.7	5269.6	637.8	21.0	616.8
SB-103	6855.1	5287.1	637.8	21.0	616.8
SB-104	6838.3	5304.1	637.8	20.0	617.8
SB-105	6817.9	5321.3	637.8	20.0	617.8
SB-106	6802.1	5339.3	637.8	20.3	617.5
SB-107	6782.4	5356.8	637.8	19.5	618.3
SB-108	6764.6	5372.8	637.6	18.5	619.1
SB-109	7027.3	5307.5	638.0	18.5	619.5
SB-110	6751.9	5660.5	638.8	21.8	617
SB-111	6688.6	5524.4	638.4	19.0	619.4
SB-112	6935.0	5575.9	639.7	19.5	620.2
SB-113	7065.9	5422.2	637.8	17.6	620.2
SB-114	7072.6	5374.8	638.1	19.3	618.8
SB-115	7071.4	5328.2	638.3	19.8	618.5
SB-116	7054.4	5472.4	637.5	18.6	618.9
SB-117	6929.2	5219.9	637.9	18.5	619.4
SB-118	6721.5	5620.5	639.1	24.8	614.3
SB-119	6708.8	5567.4	638.8	21.7	617.1
SB-120	6742.0	5280.7	637.7	20.0	617.7
SB-121	6673.0	5476.0	638.1	21.5	616.6
SB-122	6971.7	5248.3	638.1	19.1	619
SB-123	7001.1	5274.0	638.1	19.5	618.6
SB-124	7023.1	5521.0	638.6	18.5	620.1
SB-125	6855.0	5622.8	638.4	19.0	619.4
SB-126	6907.2	5615.2	638.3	19.5	618.8
SB-127	6960.9	5599.7	638.3	19.0	619.3
SB-128	6803.1	5653.1	638.9	24.5	614.4
SB-129	6712.4	5268.4	636.9	18.5	618.4
SB-130	6652.2	5448.6	637.9	19.5	618.4
SB-131	6826.5	5088.9	636.7	18.0	618.7
SB-132	6756.4	5174.5	637.0	19.0	618
SB-133	6670.7	5352.5	637.3	20.0	617.3
SB-134	6667.5	5402.1	637.7	20.5	617.2
SB-135	6737.0	5230.1	637.1	18.5	618.6
SB-136	6903.5	5146.0	637.5	18.5	619
SB-137	6985.7	5225.5	637.6	17.5	620.1
SB-138	6636.5	5397.5	637.6	20.0	617.6
SB-139	6865.6	5117.2	637.4	18.5	618.9
SB-140	6956.3	5179.7	637.6	18.5	619.1
SB-141	6999.3	5199.7	637.6	18.5	619.1
SB-142	6885.6	5641.6	638.3	19.0	619.3
SB-143	7078.6	5430.1	637.6	19.5	618.1
SB-144	6996.0	5565.6	639.7	19.7	620
SB-145	6797.4	5603.5	639.6	23.5	616.1
SB-146	6783.8	5610.0	639.6	24.0	615.6
SB-147	6777.3	5597.9	639.7	24.0	615.7
SB-148	6785.2	5620.0	639.5	22.5	617
SB-149	6833.6	5764.9	638.2	19.5	618.7
SB-150	6452.9	5749.4	639.0	21.0	618
SB-151	6763.8	5890.1	638.8	20.0	618.8
SB-152	6606.8	5818.6	639.2	21.0	618.2

**Table 1**  
**Soil Boring Location and Elevation Information**  
**American Chemical Service, Inc.**  
**Barrier Wall Investigation**  
**Off-Site Containment Area**

Boring Number	Coordinates		Ground Elevation (msl)	Depth To Clay (ft)	Clay Elevation (msl)
	Northing	Easting			
SB-201	5674.8	4984.8	647.5	NA	NA
SB-202	6059.9	5011.5	640.4	NA	NA
SB-202A	6077.4	5014.5	639.9	22.0	617.9
SB-203	6029.0	5011.5	641.0	22.0	619
SB-204	5964.5	5012.0	641.9	21.8	620.1
SB-205	5913.8	5014.2	643.4	22.5	620.9
SB-205A	5930.6	4988.6	645.9	26.5	619.4
SB-206	5856.2	5013.4	644.6	24.0	620.6
SB-207	5801.1	4978.0	646.9	25.0	621.9
SB-208	5763.9	4960.8	646.8	25.5	621.3
SB-209	5715.5	4942.1	647.4	28.0	619.4
SB-210	5690.0	4988.9	647.2	26.0	621.2
SB-211	5663.6	5186.0	650.9	29.5	621.4
SB-212	5758.7	5453.6	649.4	28.0	621.4
SB-213	5637.8	5388.9	653.1	31.0	622.1
SB-214	5946.4	5523.4	647.2	26.0	621.2
SB-215	6126.2	5615.5	647.9	28.5	619.4
SB-216	6325.7	5662.3	645.9	26.0	619.9
SB-217	6444.1	5602.8	639.5	22.0	617.5
SB-218	6517.4	5411.0	634.7	16.0	618.7
SB-219	6606.9	5299.9	633.0	14.0	619
SB-220	6496.9	5175.7	635.4	16.0	619.4
SB-221	6353.9	5138.1	634.0	13.0	621
SB-222	6223.4	5069.4	638.6	18.5	620.1
SB-223	6729.8	5059.2	638.5	20.0	618.5
SB-224	6197.5	5301.8	646.9	27.0	619.9
SB-225	6208.5	5283.1	647.3	27.0	620.3
SB-226	6192.7	5286.9	647.5	27.0	620.5
SB-227	6212.0	5297.6	646.9	27.1	619.8

**Notes:**

Coordinates and ground surface elevations surveyed by Area Survey, February 16, 1996.

NA = Not Applicable. Soil boring abandoned before reaching clay confining layer due to refusal.

msl = Mean Sea Level

**Table 2**  
**Summary of Soil Borings and Sample Analysis**  
**Conducted Along the Final Barrier Wall Alignment**  
**American Chemical Service, Inc.**  
**Griffith, Indiana**

Soil Boring Number	Sample Depth (ft) Interval	PCB Analytical Results		VOC Analytical Results	
		Field PCB Results (ppm)	IEA Lab Results (ppm)	Field GC Results (ppm)	IEA Lab Results (ppm)
SB109	13 to 15	ND	NA	1.3	NA
SB113	7 to 9	17.3	4.13	42	NA
SB113	9 to 11	ND	NA	2.3	NA
SB114	3.5 to 5.5	1.9	NA	1.1	NA
SB114	8.5 to 10.5	1.4	NA	1	NA
SB115	3.5 to 5.5	ND	NA	2	NA
SB115	6 to 8	ND	NA	NA	NA
SB116	1 to 3	NA	NA	106	NA
SB116	3.5 to 5.5	ND	NA	NA	NA
SB116	6 to 8	1.5	NA	ND	NA
SB124	6 to 8	ND	NA	NA	NA
SB124	8.5 to 10.5	5.2	6.11	NA	NA
SB124	11 to 13	NA	NA	51.6	NA
SB126	3.5 to 5.5	NA	NA	206.8	NA
SB126	11 to 13	7.6	NA	269.3	NA
SB127	6 to 8	8.5	44	NA	NA
SB127	8.5 to 10	ND	NA	352.7	NA
SB131	6 to 8	ND	NA	NA	NA
SB131	8.5 to 10	NA	NA	NA	NA
SB131	13.5 to 15.5	NA	NA	11	NA
SB136	5 to 7	ND	NA	NA	NA
SB136	17 to 19	NA	NA	25.6	NA
SB139	6 to 8	2.8	NA	NA	NA
SB139	16 to 18	NA	NA	26	NA
SB140	6 to 8	NA	NA	ND	NA
SB140	8.5 to 10.5	ND	NA	NA	NA
SB141	3.5 to 5.5	NA	NA	1.2	NA
SB141	6 to 8	ND	NA	NA	NA
SB141	8.5 to 10.5	1.5	NA	NA	NA
SB142	6 to 8	ND	NA	5,168	335
SB142	8.5 to 10.5	ND	NA	NA	NA
SB143	6 to 8	13.9	2.9	11,583	0.76
SB143	8.5 to 10.5	16.4	1.99	11.9	NA
SB144	8.5 to 10.5	8.3	NA	141	NA
SB144	11 to 13	7.4	NA	NA	NA
SB149	8.5 to 10.5	10.1	0.86	6.1	NA
SB149	16 to 18	14.4	ND	NA	NA
SB150	6 to 8	>50	0.69	ND	NA
SB151	5 to 7	14.4	ND	NA	NA
SB151	9 to 11	13.9	ND	NA	NA
SB151	19 to 21	NA	NA	70	NA
SB152	7 to 9	15.0	ND	NA	NA
SB152	9 to 11	33.0	ND	NA	NA

**Table 2 continued**  
**Summary of Soil Borings and Sample Analysis**  
**Conducted Along the Final Barrier Wall Alignment**  
**American Chemical Service, Inc.**  
**Griffith, Indiana**

Soil Boring Number	Sample Depth (ft) Interval	PCB Analytical Results		VOC Analytical Results	
		Field PCB Results (ppm)	IEA Lab Results (ppm)	Field GC Results (ppm)	IEA Lab Results (ppm)
SB202A	13.5 to 15.5	ND	NA	NA	NA
SB202A	16 to 18	ND	NA	0.9	NA
SB203	13.5 to 15.5	1.1	NA	2.7	NA
SB203	16 to 18	ND	NA	3.2	NA
SB204	13.5 to 15.5	ND	NA	1.1	NA
SB204	16 to 18	ND	NA	2.7	NA
SB205	3.5 to 5.5	NA	NA	<b>111,639</b>	NA
SB205	6 to 8	NA	NA	937	NA
SB206	5 to 7	ND	NA	4	NA
SB206	7 to 9	ND	NA	3.6	NA
SB207	13.5 to 15.5	ND	NA	ND	NA
SB207	16 to 18	ND	NA	1.1	NA
SB207	21 to 23	ND	NA	1.1	NA
SB208	11 to 13	1.2	NA	ND	NA
SB208	23.5 to 25.5	ND	NA	ND	NA
SB209	16 to 18	ND	NA	0.4	NA
SB209	18.5 to 20.5	ND	NA	2.6	NA
SB210	16 to 18	ND	NA	5.1	NA
SB210	18.5 to 20.5	ND	NA	3	NA
SB211	8.5 to 10.5	ND	NA	0.3	NA
SB211	18.5 to 20.5	ND	NA	0.8	NA
SB212	19 to 21	ND	NA	6	NA
SB212	23 to 25	NA	NA	16	NA
SB213	23.5 to 25.5	ND	NA	0.9	NA
SB213	26 to 28	NA	NA	4.4	NA
SB214	13.5 to 15.5	<b>10.6</b>	2.7	NA	NA
SB214	16 to 18	NA	NA	2.2	NA
SB214	18.5 to 20.5	ND	NA	NA	NA
SB214	21 to 23	NA	NA	9.5	NA
SB215	17 to 19	ND	NA	397	NA
SB215	19 to 21	ND	NA	1.7	NA
SB216	13.5 to 15.5	ND	NA	13	NA
SB220	8.5 to 10.5	ND	NA	3	NA
SB220	11 to 13	ND	NA	7.4	NA
SB221	9 to 11	ND	NA	152	NA
SB221	11 to 13	ND	NA	89	NA
SB222	13.5 to 15.5	ND	NA	65	NA
SB223	18.5 to 20.5	7.3	NA	1	NA

Notes:

Concentrations reported in parts per million (ppm)

NA - Not Analyzed

ND - Not Detected

**Bold** indicates an exceedence of the waste criteria as defined in the Barrier Wall Work Plan

**Table 3**  
**Geotechnical Laboratory Results Summary**  
**Barrier Wall Alignment Report**  
**American Chemical Service, Inc.**  
**Griffith, Indiana**

Soil Boring Number	Sample Number	Coordinates		Sample Depth (ft)	Liquid Limit (%)	Plasticity Index (%)	Gravel Content (%)	Sand Content (%)	P200 Content (%)	USCS	Rigid Wall Permeability (cm/s)	Flex. Wall Permeability (cm/s)
SB-212	SS4	5759	5454	7-9	NA	NA	0.0	86.9	13.1	SM	NA	NA
SB-212	SS9	5759	5454	17-19	NA	NA	5.5	87.1	7.4	SW-SM	NA	NA
SB-215	SS5	6126	5615	9-11	NA	NA	4.0	87.5	8.5	SP-SM	NA	NA
SB-215	SS10	6126	5615	19-21	NA	NA	19.8	76.5	3.7	SP	NA	NA
SB-217	SS4	6444	5603	7-9	NA	NA	32.4	62.1	5.5	SP-SM	NA	NA
SB-217	SS10	6444	5603	19-21	NA	NA	0.9	83.9	15.2	SM	NA	NA
SB-206	SS4	5856	5013	7-9	NA	NA	0.2	92.0	7.8	SP-SM	NA	NA
SB-206	SS7	5856	5013	13-15	NA	NA	0.0	90.9	9.1	SP-SM	NA	NA
SB-151	SS5	6764	5890	9-11	NA	NA	14.2	82.4	3.4	SP	NA	NA
SB-151	SS7	6764	5890	13-15	NA	NA	9.2	87.6	3.2	SP	NA	NA
SB-152	SS3	6607	5819	5-7	NA	NA	5.7	87.2	7.1	SP-SM	NA	NA
SB-152	SS10	6607	5819	19-21	NA	NA	11.5	76.3	12.2	SM	NA	NA
SB-221	SS2	6354	5138	3-5	NA	NA	0.0	90.5	9.5	SP-SM	NA	NA
SB-221	SS5	6354	5138	9-11	NA	NA	0.2	87.5	12.3	SM	NA	NA
SB-109	SS3	7027	5308	5-7	NA	NA	0.0	96.6	3.4	SP	NA	NA
SB-109	SS8	7027	5308	15-17	NA	NA	11.4	80.6	8.0	SP-SM	NA	NA
SB-136	SS2	6904	5146	3-5	NA	NA	2.0	93.0	5.0	SP-SM	NA	NA
SB-136	SS6	6904	5146	11-13	NA	NA	4.2	88.4	7.4	SP-SM	NA	NA
SB-113	SS5	7066	5422	9-11	NA	NA	0.5	92.3	7.2	SP-SM	NA	NA
SB-113	SS6	7066	5422	11-13	NA	NA	8.4	88.0	3.6	SP	NA	NA
SB-112	SS5	6935	5576	9-11	NA	NA	8.1	74.9	17.0	SM	NA	NA
SB-112	SS8	6935	5576	15-17	NA	NA	0.4	95.0	4.6	SP	NA	NA
SB-109	ST	7027	5308	19-21	30	14	1.9	7.9	90.2	CL	1.7E-08	2.0E-08
SB-151	ST	6764	5890	23-25	29	11	0.9	12.1	87.0	CL	1.8E-08	2.4E-08
SB-206	ST	5856	5013	25.5-27.5	28	12	3.3	14.3	82.4	CL	2.0E-08	NT
SB-212	ST	5759	5454	29-31	28	11	0.7	10	89.3	CL	2.4E-08	1.3E-06

Notes:

ST = Shelby tube sample

NA = Test not applicable to this sample

NT = Sample not tested because of insufficient volume of undisturbed material



**Table 4**  
**Schedule for Barrier Wall Construction**  
**American Chemical Services, Inc.**  
**Griffith, Indiana**

<b>Deliverable/Event</b>	<b>Proposed Due Date</b>	<b>Comment</b>
Submit Barrier Wall Alignment Report to EPA	1-Apr-96	
Approval of Alignment Report / Authorization to Proceed	21-Apr-96	20 Days after submitting report
Receive Proposals from Subcontractors	9-May-96	
Select Subcontractor and Barrier Technology	29-May-96	
Submit "50% Design" Document to U.S. EPA	19-Jun-96	59 days after Approval of Alignment Report
U.S. EPA provides Review Comments on "50 Design"	19-Jul-96	30 days after receiving 50% Design
Submit 100% Design to EPA	12-Aug-96	24 days after EPA Receipt of Comment
Receive EPA Approval of 100% Design	26-Aug-96	EPA reviews Final Design in 14 Days
Complete Barrier Wall Construction	1-Feb-97	159 days after EPA Approval of Design

**Note:**

Dates after April 1, 1996 are based on assumed EPA review times.



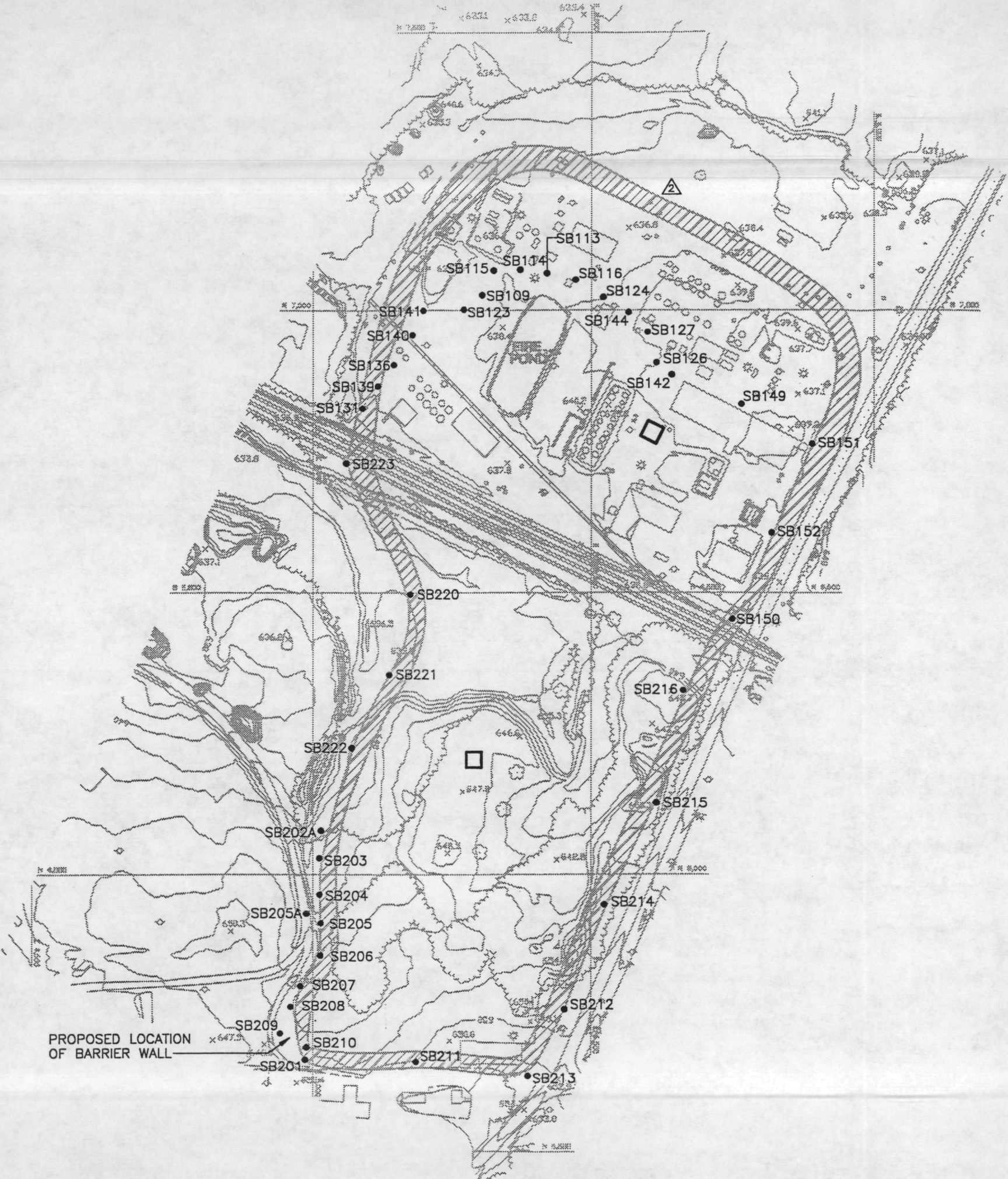
Management Review  
Other

Technical Review  
Project Manager

Graphic Standards  
Lead Professional

QUALITY  
CONTROL

This document has been developed for a specific  
application and may not be used without the  
written approval of Montgomery Watson.



**LEGEND**

- PILOT TEST CELL
- SB222 BARRIER WALL SOIL BORING LOCATION AND NUMBER
- ▨ APPROXIMATE LOCATION OF BARRIER WALL
- RAILROAD TRACK
- TOPOGRAPHIC CONTOUR

**NOTES**

1. BASE MAP DEVELOPED FROM AN AERIAL SURVEY MAP OF THE SITE FLOWN ON MARCH 8, 1994 BY GEONEX CHICAGO AERIAL SURVEY, INC.
2. VERTICAL DATUM IS U.S.G.S. DATUM. CONTOUR INTERVAL IS 2 FEET.
3. APPROXIMATE BARRIER WALL LOCATION IS BASED ON RESULTS OF SOIL BORING PROGRAM. FINAL LOCATION WILL BE DETERMINED DURING DESIGN. ⚠
4. SOIL BORINGS PERFORMED JANUARY 17, 1996 THROUGH FEBRUARY 12, 1996, BY ENVIRONMENTAL AND FOUNDATION DRILLING.
5. SOIL BORING ELEVATIONS AND LOCATIONS SURVEYED ON FEBRUARY 12 AND 16, 1996, BY AREA SURVEY.

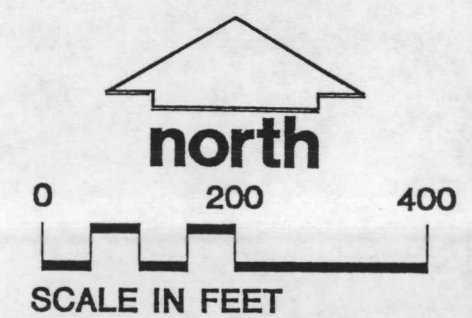


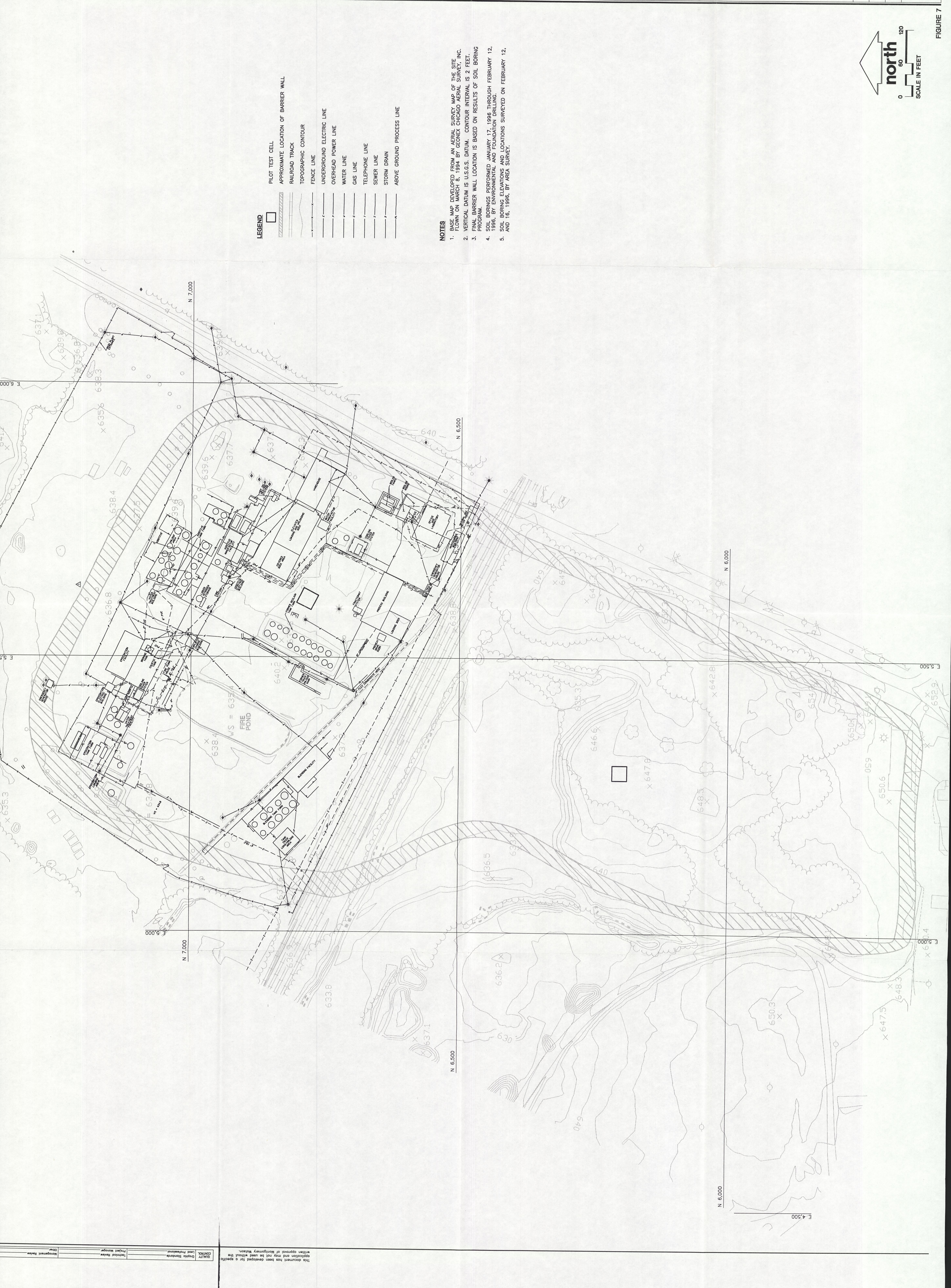
FIGURE 2

<b>BARRIER WALL ALIGNMENT</b>  BARRIER WALL ALIGNMENT INVESTIGATION AMERICAN CHEMICAL SERVICE, INC. NPL SITE GRIFFITH, INDIANA	Developed By	PJV	Drawn By	DLF, LCL
	Approved By	PJV	Date	3/28/96
	Reference			
	Revisions			
	MODIFIED NOTE 3. 6/28/96-LCL/RHW			
	REVISED BARRIER WALL ALIGNMENT. 8/16/96-DLF/DAP			

Drawing Number  
4077.0075 **B2**

**MONTGOMERY  
WATSON**







B1

SOIL BORING LOGS –  
PROPOSED FINAL ALIGNMENT

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Still Bottoms/Treatment Lagoon

Location Griffith, Indiana

Boring No. **SB109**

Job No. 4077.0075

Sheet 1 of 2

Surface Elevation 638.0

Northing: 7027.3

Easting: 5307.5

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	TYPE	Rec. (in.)	Mois- ture	N Value		qu (qa) (tsf)	PID (ppm)	Remarks
					Brown Fine SAND (SP), Trace Gravel			
1		20	M/W	5	Orange Brown, Fine SAND (SP), Grades into Olive Gray Silt from 2 to 2.2 ft, Then into a Olive Gray Fine Sand, Sweet Musty Odor Present	--	4.0	
2		20	M	8	Dark Gray to Brown Stained Fine SAND and SILT (SM), Grades into Dark Gray Stained Fine Sand at 4.5 ft	--	25.0	
3		20	W	9	Gray Stained Fine SAND (SP), Trace Organics (Roots), Musty odor Present	--	5.0	
4		16	W	10	Brown Fine SAND (SP), Trace Silt, Grades into Gray Stained Fine Sand, Some Black Stained Layers, Musty Odor Present	--	55.0	
5		16	W	12	Gray Stained Fine SAND (SP) to 10.5 ft, Grades into Gray Brown, Fine to Coarse SAND, Musty Odor Present	--	75.0	
6		18	W	13	Gray Fine SAND (SP), Trace Silt and Clay, Fine to Coarse Sand at 12.5 to 13.0 ft	--	87.0	
7		16	W	13	Gray Fine to Coarse SAND and GRAVEL (SP/GP), Little Black Staining at 14.5 to 15.0 ft, Musty Odor Present	--	49.0	Field analysis for VOCs and PCBs

**WATER LEVEL OBSERVATIONS**

**GENERAL NOTES**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling                       
 Depth to Water                       
 Depth to Cave in                     

Start 1/19/96 End 1/19/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 4 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project **American Chemical Service, Inc.**  
 Still Bottoms/Treatment Lagoon  
 Location **Griffith, Indiana**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

Boring No. **SB109**  
 Job No. **4077.0075**  
 Sheet **2** of **2**  
 Surface Elevation **638.0**  
 Northing: **7027.3**  
 Easting: **5307.5**

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
8	16	W	16		Gray, Fine to Coarse SAND and GRAVEL (SP/GP) to 16.0 ft, Grades into Gray Brown Fine Sand, Trace Silt and Clay, Musty Odor Present	--	14.0	
9	18	W/M			Gray, Fine to Coarse SAND (SP) from 17 to 17.5 ft, then Grades into Gray Brown Fine SAND, Musty Odor Present	--	64.0	
					Hard, Gray Silty CLAY (CL-ML)	>4.0		
10	18	M						
				20	Hard, Gray Silty CLAY (CL-ML), Trace Fine to Coarse Sand, Fine Gravel			
					End of Boring at 21.0 ft			
					Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			
				25				
				30				

**MONTGOMERY  
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**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Still Bottoms/Treatment Lagoon

Location Griffith, Indiana

Boring No. **SB113**

Job No. **4077.0075**

Sheet **1** of **2**

Surface Elevation **637.8**

Northing: **7065.9**

Easting: **5422.2**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Brown Fine SAND and Fine to Coarse GRAVEL (GP)			
1	20	M	6		Brown Fine SAND (SP), Trace Medium to Coarse Sand and Fine Gravel, Thin Gray Clayey Zone at 2.0 ft	--	0.0	
2	20	M	6		Black Fine SAND (SP), Some Silt, Organics and Roots Present, Wood Chips from 2.6 to 2.7 ft, Sulfur and Solvent Odors Present	--	134.0	
3	20	W	5	5	Dark Gray to Black, Fine SAND (SP), Little Medium to Coarse Sand, Trace Fine Gravel, Solvent Odor Present	--	1285.0	
4	20	W	11		Black/Gray, Fine to Coarse SAND (SP), Strong Solvent Odor and Petroleum Sheen Present, Black Staining from 7.8 to 8.5 ft; Black Stained, Fine to Coarse Sand and Gravel from 8.1 to 9.0 ft	--	3875.0	Field analysis for VOCs and PCBs
5	20	W	12	10	Black and Gray-Brown, Petroleum Sheen Stained, Fine to Coarse SAND (SP), Fine Gravel, Solvent Odor Present	--	6529.0	Field anlysis for VOCs and PCBs
6	20	W	13		Gray Stained, Fine to Coarse SAND and Fine Gravel (SP) to 12.5 ft, Grades into Gray-Brown, Fine Sand, Solvent Odor Present	--	13.0	
7	20	W	10		Gray-Brown Fine SAND (SP), Trace Medium to Coarse Sand and Fine Gravel, Slight Musty Solvent Odor Presnt	--	0.0	
				15				

**WATER LEVEL OBSERVATIONS**

**GENERAL NOTES**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling                       
 Depth to Water                       
 Depth to Cave in                     

Start 1/23/96 End 1/23/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 4 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. **SB113**  
 Job No. 4077.0075  
 Sheet 2 of 2  
 Surface Elevation 637.8  
 Northing: 7065.9  
 Easting: 5422.2

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
8	20	W	15		Gray-Brown Fine SAND (SP), Trace to Little, Medium to Coarse Sand, Fine Gravel, Slight Musty Odor	—	67.0	
9	22	W/M	17		Gray/Brown, Fine to Coarse SAND and GRAVEL (GP)		1283.0	PID reading in sand
					Hard, Gray, Silty CLAY (CL-ML), Trace Fine to Coarse Sand	> 4.5	2812.0	PID reading in clay
10						—		
				20	End of Boring at 20.0 ft  Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			
				25				
				30				

**MONTGOMERY  
WATSON**

**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. **SB114**  
 Job No. 4077.0075  
 Sheet 1 of 2  
 Surface Elevation 638.1  
 Northing: 7072.6  
 Easting: 5374.8

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Brown SAND and GRAVEL (GP)			
1	14	M	6		Dark Brown to Black Stained, Fine SAND and SILT (SM), Organics (Roots) and Musty Solvent Odor Present	--	498.0	
2	22	M/W	6		Dark Gray to Black Stained, Fine SAND (SP), Grades into Olive Gray Brown Fine SAND, Trace to Little Silt at 5 ft, Musty Solvent Odor Present	--	904.0	Field analysis for VOCs and PCBs
3	12	W	8		Gray Brown Fine SAND (SP), Trace Silt, Musty Solvent Odor Present	--	66.0	
4	14	W	6		Olive Gray Brown Fine SAND (SP), Trace Medium to Coarse Sand and Silt, Musty Solvent Odor Present	--	111.0	Field analysis for VOCs and PCBs
5	16	W	9		Gray, Fine to Coarse SAND (SP), Trace Silt, Musty Odor Present	--	318.0	
6	16	W	7		Gray, Fine to Coarse SAND (SP), Trace Silt, Musty Odor Present	--	0.0	

**WATER LEVEL OBSERVATIONS**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling         
 Depth to Water         
 Depth to Cave in       

**GENERAL NOTES**

Start 1/23/96 End 1/23/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 2 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

J4077Gint40770 ID: CHICAGO

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project **American Chemical Service, Inc.**  
**Still Bottoms/Treatment Lagoon**  
 Location **Griffith, Indiana**

Boring No. **SB114**  
 Job No. **4077.0075**  
 Sheet **2 of 2**  
 Surface Elevation **638.1**  
 Northing: **7072.6**  
 Easting: **5374.8**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	18	W	12		Gray Fine SAND (SP), Trace Medium to Coarse Sand 1 in. Clay and Silt Lenses at 17 and 17.5 ft	--	34.0	
8	22	W/M	7		Gray Fine SAND (SP), Musty Odor Present to 19.3 ft	--	3282.0	
				20	Hard, Gray Silty CLAY (CL-ML) at 19.3 ft, Trace Fine to Coarse Sand	> 4.5		
9	6	M			Hard, Silty CLAY (CL-ML), Trace Fine to Coarse Sand	> 4.5		Blow-in sand on top of clay in last spoon
					End of Boring at 22.0 ft			
				25	Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			
				30				

**MONTGOMERY  
WATSON**

**LOG OF TEST BORING**

Project **American Chemical Service, Inc.**  
**Still Bottoms/Treatment Lagoon**  
 Location **Griffith, Indiana**

Boring No. **SB115**  
 Job No. **4077.0075**  
 Sheet **1 of 2**  
 Surface Elevation **638.3**  
 Northing: **7071.4**  
 Easting: **5328.2**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	TYPE	Rec. (in.)	Mois- ture	N Value	Depth (ft.)	qu (qa) (tsf)	PID (ppm)	Remarks
					Brown Sand and Gravel (FILL)			
1		14	M	6	Brown Fine SAND (SP), Grades into Dark Gray to Black Fine SAND (Stained), Trace Organics (Roots), Trace Small Pieces of Wood, Sweet Musty Odor Present	--	66.0	
2		22	M	8	Dark Gray Brown Fine SAND (SP), Trace Roots, Sweet Musty Odor Present	--	156.0	Field analysis for VOCs and PCBs
3		18	W	7	Dark Gray to Black Stained, Fine to Coarse SAND (SP), Trace Medium to Coarse Sand, Sweet Musty Odor Present	--	83.0	Field analysis for PCBs
4		14	W	7	Grades into Brown, Fine to Coarse SAND (SP) at 9.5 ft, Sweet Musty Odor Present	--	34.0	
5		14	W	6	Gray, Fine SAND (SP), Trace Medium to Coarse Sand, Small Pieces of Wood from 12 to 12.5 ft, Sweet Musty Odor Present	--	7.0	
6		12	W	14	Grades into Gray Brown Fine to Coarse SAND (SP) at 14.5 ft, Musty Odor Present	--	28.0	

**WATER LEVEL OBSERVATIONS**
**GENERAL NOTES**

While Drilling ☒ ft. Upon Completion of Drilling ☒ ft.  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

Start **1/24/96** End **1/24/96**  
 Driller **E & F** Chief **GH** Rig **CME 55**  
 Logger **DAP** Editor **PMS**  
 Drill Method **2 1/4" I.D. HSA**

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Still Bottoms/Treatment Lagoon

Location Griffith, Indiana

Boring No. **SB115**

Job No. **4077.0075**

Sheet **2** of **2**

Surface Elevation **638.3**

Northing: **7071.4**

Easting: **5328.2**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	16	W	9		Gray Brown, Fine to Coarse SAND (SP), Sweet Musty Odor Present	--	12.0	
8	18	W/M	12			--	9.0	
				20	Hard, Gray, Silty CLAY (CL-ML), Trace Fine to Coarse Sand and Fine Gravel	> 4.5		
9	14	M	13		Hard, Gray Silty CLAY (CL-ML)	> 4.5		
					End of Boring at 22.0 ft			
				25	Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			
				30				

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. SB116  
 Job No. 4077.0075  
 Sheet 1 of 2  
 Surface Elevation 637.5  
 Northing: 7054.4  
 Easting: 5472.4

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Gravel and Gray Slag, Some Brown Sand and Clay (FILL)			
1	20	M	6		Dark Brown and Black Stained, Fine to Coarse SAND (SP), Solvent Odor Present	--	459.0	
2	20	M/W	6		Black Stained, Fine SAND (SP), Trace Silt and Organics (Roots)	--	7.0	Field analysis for VOCs and PCBs
3	16	W	6		Dark Gray to Black Stained, Fine SAND (SP), Grades to Gray-Brown at 7.0 ft, Solvent Odor Present	--	38.0	Field analysis for VOCs and PCBs
4	12	W	8		Dark Gray, Fine to Coarse SAND and Fine GRAVEL (SP), Black Staining at 9.8 to 10.0 ft, Solvent Odor Present	--	28.0	
5	18	W	10		Grades into Gray/Brown, Fine to Coarse SAND (SP), Little fine Gravel at 11.5 ft, Solvent Odor Present	--	0.0	
6	12	W	7		2 in. Thick Dark Gray, Fine to Coarse SAND and Fine GRAVEL (SP) Layer at 14 ft	--	1.0	Blow in

**WATER LEVEL OBSERVATIONS**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling     
 Depth to Water     
 Depth to Cave in   

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**GENERAL NOTES**

Start 1/24/96 End 1/24/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 2 1/4" I.D. HSA

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. **SB116**  
 Job No. 4077.0075  
 Sheet 2 of 2  
 Surface Elevation 637.5  
 Northing: 7054.4  
 Easting: 5472.4

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (q <sub>a</sub> ) (tsf)	PID (ppm)	Remarks
7	20	W	10		Gray/Brown Fine SAND (SP), Little to Some, Medium to Coarse Sand, Thin Clay Seam from 18.5 to 18.7 ft, Slight Musty Odor Present	--	17.0	
8	22	M	11		Hard, Gray, Silty CLAY (CL-ML), Trace Fine to Coarse Sand and Fine Gravel	> 4.5	17.0	PID from sand
				20			20.0	PID from clay
9					Sand Blow-in; Advanced Sampler Again	> 4.5		
					Hard, Gray, Silty CLAY (CL-ML)			
					End of Boring at 22.0 ft			
					Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			
				25				
				30				

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. **SB123**  
 Job No. 4077.0075  
 Sheet 1 of 2  
 Surface Elevation 638.1  
 Northing: 7001.1  
 Easting: 5274.0

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qs) (tsf)	PID (ppm)	Remarks
					Brown Fine SAND and GRAVEL (SP/GP)			
1	16	M/W	8		Brown Fine SAND (SP), Very Slight Solvent Odor Present	--	7.0	
2	18	W	6		Grades into Gray Brown Fine SAND (SP), Some Black Silty Fine Sand, Black Stained from 5 to 5.5 ft, Musty Propane Like Odor	--	366.0	Field anlysis for VOCs and PCBS
3	20	W	4		Black Stained Fine SAND (SP), Sulfur Swampy Odor (Rotten Egg Odor)	--	58.0	Field analysis for PCBs
4	10	W	3		Dark Gray Fine SAND (SP), Slight Sulfur Swampy Odor	--	37.0	
5	10	W	9		Grades into Gray, Fine to Coarse SAND (SP) at 11 ft, Slight Sulfur Odor Present	--	73.0	
6	14	W	11		Gray Fine SAND (SP), Grades into Gray, Fine to Coarse Sand from 15 to 15.5 ft	--	0.0	

**WATER LEVEL OBSERVATIONS**

**GENERAL NOTES**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling                       
 Depth to Water                       
 Depth to Cave in                     

Start 1/26/96 End 1/26/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 2 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. **SB123**  
 Job No. 4077.0075  
 Sheet 2 of 2  
 Surface Elevation 638.1  
 Northing: 7001.1  
 Easting: 5274.0

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	20	W	9			--	0.0	
8	20	W/M	10		Gray, Fine to Coarse SAND and Fine GRAVEL (SP), Musty Odor Present	-- > 4.5	5.0	
				20	Hard, Gray Silty CLAY (CL-ML), Trace Fine to Coarse Sand			
9	8	M	13		Hard Gray, Silty CLAY (CL-ML), Trace Fine to Coarse Sand	> 4.5		
					End of Boring at 22.0 ft			
					Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			
				25				
				30				

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Still Bottoms/Treatment Lagoon

Location Griffith, Indiana

Boring No. **SB124**

Job No. 4077.0075

Sheet 1 of 2

Surface Elevation 638.6

Northing: 7023.1

Easting: 5521.0

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Gravel and Gray Slag, Brown Fine Sand (FILL)			
1	14	M	6		Brown Fine SAND (SP), Grades into Dark Brown to Black Fine Sand, Some Silt, Trace Organics, Small Gravel, Slight Solvent Odor Present	--	132.0	
2	18	M/W	6		Olive Gray Brown Fine SAND (SP), Slight Rusty Odor Present	--	27.0	
3	18	W	8		Olive Gray Brown Fine SAND (SP), Black Stained from 7 to 7.3 ft, Gray Stained from 7.3 to 7.6 ft, Brown Fine Sand at 7.6 ft, Musty Odor Present	--	247.0	Field analysis for PCBs
4	7	W	6		Brown Fine SAND (SP), Grades into Dark Gray, Fine to Coarse SAND and GRAVEL at 10 ft, Musty Oily Odor Present	--	198.0	Poor recovery, field analysis for PCBs
5	20	W	9		Gray, Fine to Coarse SAND and GRAVEL (GP), Grades into Brown, Fine to Coarse SAND and GRAVEL at 12 ft, Sweet Musty Odor present	--	512.0	Field analysis for VOCs
6	14	W	9		Gray Brown, Fine to Coarse SAND (SP), Trace Medium to Coarse Sand, Sweet Musty Propane Like Odor Present	--	65.0	

**WATER LEVEL OBSERVATIONS**

**GENERAL NOTES**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling                       
 Depth to Water                       
 Depth to Cave in                     

Start 1/26/96 End 1/26/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 2 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**MONTGOMERY  
WATSON****LOG OF TEST BORING**

Project **American Chemical Service, Inc.**  
**Still Bottoms/Treatment Lagoon**  
Location **Griffith, Indiana**

Boring No. **SB124**  
Job No. **4077.0075**  
Sheet **2 of 2**  
Surface Elevation **638.6**  
Northing: **7023.1**  
Easting: **5521.0**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	18	W	13		Gray, Fine to Coarse SAND (SP), Little Fine Gravel, Grades into Gray Brown Fine Sand at 17 ft, Sweet Musty Propane-Like Odor Present	--	50.0	
8	22	M			Hard, Gray Silty CLAY (CL-ML), Trace Fine to Coarse Sand	> 4.5		
				20		> 4.5		
					End of Boring at 20.5 ft  Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			
				25				
				30				

# MONTGOMERY WATSON



## LOG OF TEST BORING

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. **SB126**  
 Job No. **4077.0075**  
 Sheet **1** of **2**  
 Surface Elevation **638.3**  
 Northing: **6907.2**  
 Easting: **5615.2**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	TYPE	Rec. (in.)	Mois- ture	N Value	Depth (ft.)	qu (qa) (tsf)	PID (ppm)	Remarks
					Gravel and Gray Slag, Brown Fine Sand (FILL)			
1		16	M	8	Gray Brown, Fine to Coarse SAND and Fine GRAVEL (SP/GP), Grades into Brown Fine Sand, Slight Solvent Odor Present	--	475.0	
2		16	M	8	Olive Gray Brown Fine SAND (SP), Grades into Fine to Coarse Sand, Gravel at 5.0 to 5.5 ft, Solvent Odor Present	--	604.0	Field analysis for VOCs
3		14	M/W	5	Olive Gray to Black Stained, Fine to Coarse SAND (SP), Little Fine Gravel, Solvent Odor Present	--	394.0	
4		0	W	1/24"	No Recovery	--		
5		12	W	7	Brown SAND and GRAVEL (SP/GP), Oily Stained Zone at 11.5 ft, Grades into Olive Brown, Fine to Coarse Sand and Gravel to 12.5 ft then into Gray Fine Sand (Solvent-Oily Odor Throughout Sample Interval)	--	662.0	Field analysis for VOCs and PCBs
6		14	W	6	Dark Brown Fine SAND (SP), Sweet Musty Propane-Like Odor Present	--	132.0	

### WATER LEVEL OBSERVATIONS

### GENERAL NOTES

While Drilling ▽ ft. Upon Completion of Drilling ▽ ft.  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

Start 1/29/96 End 1/29/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 2 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



**MONTGOMERY  
WATSON**

**LOG OF TEST BORING**

Project **American Chemical Service, Inc.**  
**Still Bottoms/Treatment Lagoon**  
 Location **Griffith, Indiana**

Boring No. **SB127**  
 Job No. **4077.0075**  
 Sheet **1** of **2**  
 Surface Elevation **638.3**  
 Northing: **6960.9**  
 Easting: **5599.7**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Gravel and Gray Slag (FILL)			
1	24	M	5		Black to Dark Gray Brown, Fine SAND (SP), Sweet Musty Odor (Propane-Like)	--	271.0	
					No Recovery, Brown Oily Sheen on Sampler			
2	24	M	1/24"			--	494.0	
				5	No Recovery			
3	24	M/W	24			--	995.0	Field analysis for PCBs
4		W	2		Brown Oily Stained, Fine to Coarse SAND (SP), Some Medium to Coarse Sand and Fine Gravel, Sheen, Varnish Odor Present	--	1086.0	Sheen  Field analysis for VOCs and PCBs
				10				
5		W	5		Brown, Fine to Coarse SAND (SP), Some Black to Dark Gray Staining, Trace Fine Gravel, Solvent Odor, Sheen	--	1305.0	Sheen
6		W	7		Brown, Fine to Coarse SAND (SP), Grades into Brown Fine Sand, Solvent Odor	--	1051.0	Sheen
				15				

**WATER LEVEL OBSERVATIONS**

While Drilling ☒ ft. Upon Completion of Drilling ☐ ft.  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

**GENERAL NOTES**

Start **1/29/96** End **1/29/96**  
 Driller **E & F** Chief **GH** Rig **CME 55**  
 Logger **DAP** Editor **PMS**  
 Drill Method **2 1/4" I.D. HSA**

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

J4077\Gint\40770\_ID: CHICAGO

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. SB127  
 Job No. 4077.0075  
 Sheet 2 of 2  
 Surface Elevation 638.3  
 Northing: 6960.9  
 Easting: 5599.7

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7		W	10		Brown Fine SAND (SP), Solvent Odor Present	--	994.0	
8		W/M	13			--	3.0	
9					Very Stiff, Gray Silty CLAY (CL-ML)	--		
						--		
					End of Boring at 22.0 ft  Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			

**MONTGOMERY  
WATSON**

**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. SB127  
 Job No. 4077.0075  
 Sheet 1 of 2  
 Surface Elevation 638.3  
 Northing: 6960.9  
 Easting: 5599.7

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Gravel and Gray Slag (FILL)			
1	24	M	5		Black to Dark Gray Brown, Fine SAND (SP), Sweet Musty Odor (Propane-Like)	--	271.0	
					No Recovery, Brown Oily Sheen on Sampler			
2	24	M	1/24"			--	494.0	
				5	No Recovery			
3	24	M/W	24			--	995.0	Field analysis for PCBs
4		W	2		Brown Oily Stained, Fine to Coarse SAND (SP), Some Medium to Coarse Sand and Fine Gravel, Sheen, Varnish Odor Present	--	1086.0	Sheen  Field analysis for VOCs and PCBs
				10				
5		W	5		Brown, Fine to Coarse SAND (SP), Some Black to Dark Gray Staining, Trace Fine Gravel, Solvent Odor, Sheen	--	1305.0	Sheen
6		W	7		Brown, Fine to Coarse SAND (SP), Grades into Brown Fine Sand, Solvent Odor	--	1051.0	Sheen
				15				

**WATER LEVEL OBSERVATIONS**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling         
 Depth to Water         
 Depth to Cave in       

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**GENERAL NOTES**

Start 1/29/96 End 1/29/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 2 1/4" I.D. HSA



**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Still Bottoms/Treatment Lagoon

Location Griffith, Indiana

Boring No. SB127

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 638.3

Northing: 6960.9

Easting: 5599.7

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7		W	10		Brown Fine SAND (SP), Solvent Odor Present	--	994.0	
8		W/M	13		Very Stiff, Gray Silty CLAY (CL-ML)	--	3.0	
9						--		
					End of Boring at 22.0 ft			
					Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			

**MONTGOMERY  
WATSON**

**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. **SB131**  
 Job No. 4077.0075  
 Sheet 1 of 2  
 Surface Elevation 636.7  
 Northing: 6826.5  
 Easting: 5088.9

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Gravel and Gray Slag (FILL)			
1	4	M	4		Dark Brown to Black Fine SAND (SP), Piece of Slag in Spoon, Poor Recovery	--	6.0	
2	18	M	10		Dark Brown to Dark Gray Brown Fine SAND (SP), Little Medium to Coarse Sand and Fine Gravel, Trace Roots and Silt	--	9.0	
3	16	W	9		Black Stained Fine SAND (SP), Grades to Brown to Gray Brown Fine Sand, Slight Musty Odor	--	3.0	Field analysis for PCBs
4	14	W	6		Dark Gray to Gray Fine SAND (SP), Trace Silt, Trace Roots (Organic Matter), Slight Sulfur Odor Present	--	11.0	
5	18	W	7		Dark Gray Fine SAND (SP), Silty Clay Seam from 12.0 to 12.5 ft, Grades into Fine to Coarse Sand and Gravel, Silty and Clay at 12.5 ft, Slight Sweet Musty Odor Present	--	5.0	
6	14	W	11		Gray Brown Fine SAND (SP), Trace Fine to Coarse Gravel, Sweet Propane-Like Odor Present	--	140.0	Field analysis for VOCs

**WATER LEVEL OBSERVATIONS**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling                       
 Depth to Water                       
 Depth to Cave in                     

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**GENERAL NOTES**

Start 1/31/96 End 1/31/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 2 1/4" I.D. HSA

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. SB131  
 Job No. 4077.0075  
 Sheet 2 of 2  
 Surface Elevation 636.7  
 Northing: 6826.5  
 Easting: 5088.9

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	14	W	8		Gray Fine SAND, Grades into Gray, Fine to Coarse Sand to 17.0 ft, Sweet Musty Odor, Clay in Tip of Spoon at 18.0 ft	--	98.0	
8	22	W	10		Very Stiff, Gray Silty CLAY (CL-ML), Trace Fine to Coarse Sand	3.0		
				20		3.5		
					End of Boring at 20.5 ft  Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			
				25				
				30				

**MONTGOMERY  
WATSON**

**LOG OF TEST BORING**

 Project American Chemical Service, Inc.
Still Bottoms/Treatment Lagoon

 Location Griffith, Indiana

 Boring No. **SB136**

 Job No. 4077.0075

 Sheet 1 of 2

 Surface Elevation 637.5

 Northing: 6903.5

 Easting: 5146.0

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	TYPE	Rec. (in.)	Mois- ture	N Value		qu (qa) (tsf)	PID (ppm)	Remarks
					Gravel and Gray Slag, Fine Sand (FILL)			
1		20	M	12	Black Fine SAND and SILT (FILL), Small Pieces of Wood, Grades into Olive Gray Brown Fine SAND at 2.5 ft, Musty Odor Present	--	0.0	
2		20	M/W	7	Gray Brown Fine SAND (SP), Some Black Staining, Some Black Silt at 4 to 4.5 ft, Musty Odor Present	--	0.0	
3		22	W	6	Dark Gray Brown to Black Stained, Fine SAND (SP), Slight Musty Odor Present	--	10.0	Field analysis for PCBs
4		20	W	6	Gray Brown Fine SAND (SP), Trace Black Staining, Slight Musty Odor Present	--	11.0	
5		20	W	7	Dark Gray, Fine to Coarse SAND (SP), Little Silt and Clay, Silt and Clay Lense from 11 to 11.5 ft, Dark Gray Fine to Coarse Sand and Gravel, Slight Musty odor Present	--	4.0	
6		20	W	14	Gray, Fine to Coarse SAND and Fine GRAVEL (SP), Some Silt, Slight Musty Odor Present	--	22.0	
7		22	W	13	Gray, Fine to Coarse SAND (SP), Grades into Gray Brown Fine Sand at 14.0 ft	--	15.0	

**WATER LEVEL OBSERVATIONS**

 While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling         
 Depth to Water         
 Depth to Cave in       
**GENERAL NOTES**

 Start 2/1/96 End 2/5/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 4 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

J4077V.Gmt40770 ID: CHICAGO

**MONTGOMERY  
WATSON****LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
Location Griffith, Indiana

Boring No. SB136  
Job No. 4077.0075  
Sheet 2 of 2  
Surface Elevation 637.5  
Northing: 6903.5  
Easting: 5146.0

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
8	22	W	13		Gray Brown, Fine to Coarse SAND (SP) to 16.5 ft, Then into Gray Brown Fine Sand, Sweet Propane Like Odor Present	—	109.0	
9	22	W/M	12		Gray Brown, Fine to Coarse SAND (SP), Solvent Like Odor Present	> 4.5	1012.0	Field analysis for VOCs
10	18	M	14		Very Stiff to Hard, Gray Silty CLAY (CL-ML) Hard, Gray, Silty CLAY (CL-ML), Trace Fine to Coarse Sand and Gravel	> 4.5	4.0	
				20				
					End of Boring at 20.5 ft  Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			
				25				
				30				

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. SB139  
 Job No. 4077.0075  
 Sheet 1 of 2  
 Surface Elevation 637.4  
 Northing: 6865.6  
 Easting: 5117.2

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Gray Slag and Gravel (FILL)			
1	6	M	26		Gray Brown Fine SAND (SP), Over Black Silt and Fine Sand, Trace Fine to Coarse Gravel, No Odors Present	--	0.0	
2	18	M	10		Light Brown Fine SAND (SP), Trace Fine Gravel, Very Slight Musty Odor Present	--	104.0	
3	20	W	7		Dark Gray to Black Stained, Fine SAND (SP), Musty Sulfur Odor Present	--	113.0	Field analysis for PCBs
4	20	W	5		Black Fine SAND (SP), Musty Sulfur Odor Present	--	198.0	
5	16	W	6		Dark Gray Fine SAND (SP), Grades into Fine to Coarse SAND at 12.0 ft, Musty Sulfur Odor Present	--	101.0	
6	16	W	7		Gray, Fine to Coarse SAND (SP), Grades into Gray Brown Fine Sand, Musty Propane-Like Odor Present	--	30.0	

**WATER LEVEL OBSERVATIONS**

**GENERAL NOTES**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling         
 Depth to Water         
 Depth to Cave in       

Start 2/5/96 End 2/5/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 2 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. **SB139**  
 Job No. 4077.0075  
 Sheet 2 of 2  
 Surface Elevation 637.4  
 Northing: 6865.6  
 Easting: 5117.2

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	20	W	8		Gray Brown Fine SAND (SP), Musty Propane Like Odor Present	--	434.0	Field analysis for VOCs
8	24	M	13		Very Stiff to Hard, Gray, Silty CLAY (CL-ML), Trace Fine to Coarse Sand and Gravel at 18.5 ft	--		
				20				
					End of Boring at 20.5 ft  Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			
				25				
				30				

# MONTGOMERY WATSON



## LOG OF TEST BORING

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. SB140  
 Job No. 4077.0075  
 Sheet 1 of 2  
 Surface Elevation 637.6  
 Northing: 6956.3  
 Easting: 5179.7

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Gray Slag and Gravel (FILL)			
1	12	M	8		Gray Brown Fine SAND (SP), Grades into Dark Brown Fine Sand at 2.5 ft	—	0.0	
2	20	M	5		Dark Brown to Black Fine SAND (SP) and Silt, Trace Organics, Grades into Brown Fine Sand, Slight Musty Odor Present	—	0.0	
3	18	W	7		Dark Gray Fine SAND (SP), Musty Odor Present, Trace Roots	—	10.0	Field analysis for VOCs
4	16	W	4		Dark Brown to Black Stained (Creosote Like Odor), Fine SAND (SP) to 9.5 ft, Grades into Light Gray Brown, Fine to Coarse Sand, Musty Odor Present	—	5.0	Field analysis for PCBs
5	16	W	6		Gray Brown Fine SAND (SP), Grades into Gray Fine to Coarse Sand and Fine Gravel at 12.5 ft, Sweet Musty Odor Present	—	9.0	
6	16	W	6		Gray Brown Fine SAND (SP), Trace Medium to Coarse Sand and Fine Gravel, Sweet Musty Odor Present	—	0.0	

### WATER LEVEL OBSERVATIONS

### GENERAL NOTES

While Drilling ▽ ft. Upon Completion of Drilling ▽ ft.  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

Start 2/6/96 End 2/6/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 2 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

4077/Gint40770 ID: CHICAGO



**MONTGOMERY  
WATSON****LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
Location Griffith, Indiana

Boring No. SB140  
Job No. 4077.0075  
Sheet 2 of 2  
Surface Elevation 637.6  
Northing: 6956.3  
Easting: 5179.7

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	16	W	10		Gray Brown Fine SAND (SP), Little to Some, Medium to Coarse Sand, Trace Fine Gravel, Sweet Musty Odor Present	--	0.0	
8	22	W	9		Very Stiff, Gray, Silty CLAY (CL-ML), Trace Fine to Coarse Sand and Gravel	--	0.0	
				20				
					End of Boring at 20.5 ft  Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			
				25				
				30				

**MONTGOMERY  
WATSON**

**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. **SB141**  
 Job No. 4077.0075  
 Sheet 1 of 2  
 Surface Elevation 637.6  
 Northing: 6999.3  
 Easting: 5199.7

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qs) (tsf)	PID (ppm)	Remarks
					Gray Slag and Gravel (FILL)			
1	16	M	7		Brown Fine SAND (SP), Grades into Dark Brown Fine Sand, Solvent Odor at 2.5 to 3.0 ft Zone	--	67.0	
2	18	M	6		Gray Fine SAND (SP), Sulfur Odor Present, Little Black Staining at 5.2 to 5.5 ft	--	2348.0	Field analysis for VOCs
3	18	W	6		Black Stained Fine SAND (SP) to 6.5 ft, Grades into Dark Gray Fine Sand to Olive Gray Brown Fine Sand at 7.5 ft, Musty Odor Present	--	21.0	Field analysis for PCBs
4	14	W	6		Gray Fine SAND (SP), Little Brown to Black Staining from 9.5 to 10.0 ft, Musty Odor Present	--	164.0	Field analysis for PCBs
5	12	W	4		Gray Fine SAND (SP), Trace Medium to Coarse Sand and Fine Gravel, Musty Odor Present	--	22.0	
6	16	W	8		Gray, Fine to Coarse SAND (SP) to 14.5 ft, Grades into Gray Brown Fine Sand, Thin Silt Lense at 14.7 to 14.8 ft, Sweet Propane-Like Odor Present	--	7.0	

**WATER LEVEL OBSERVATIONS**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling                       
 Depth to Water                       
 Depth to Cave in                     

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**GENERAL NOTES**

Start 2/6/96 End 2/6/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 2 1/4" I.D. HSA

**MONTGOMERY  
WATSON****LOG OF TEST BORING**Project American Chemical Service, Inc.Still Bottoms/Treatment LagoonLocation Griffith, IndianaBoring No. **SB141**Job No. 4077.0075Sheet 2 of 2Surface Elevation 637.6Northing: 6999.3Easting: 5199.7

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	16	W	12		Gray Brown Fine SAND (SP), Trace Medium to Coarse Sand and Fine Gravel, Sweet Propane Like Odor Present	—	6.0	
8	22	M	11		Very Stiff to Hard Gray, Silty CLAY (CL-ML), Trace Fine to Coarse Sand and Gravel	4.0- >4.5		
				20				
					End of Boring at 20.5 ft			
					Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			
				25				
				30				

Project **American Chemical Service, Inc.**  
**Still Bottoms/Treatment Lagoon**  
 Location **Griffith, Indiana**

**Boring No. SB142**  
**Job No. 4077.0075**  
**Sheet 1 of 2**  
**Surface Elevation 638.3**  
**Northing: 6885.6**  
**Easting: 5641.6**

## GENERAL NOTES

Start 2/6/96 End 2/6/96  
Driller E & F Chief GH Rig CME 55  
Logger DAP Editor PMS  
Drill Method 2 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

JV4077\Gint\40770 ID: CHICAGO

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. **SB142**  
 Job No. 4077.0075  
 Sheet 2 of 2  
 Surface Elevation 638.3  
 Northing: 6885.6  
 Easting: 5641.6

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	14	W	10		Gray Brown Fine SAND (SP), Trace Medium to Coarse Sand, Fine Gravel, Sweet Propane Like Odor Present, Some Fine to Coarse Sand in Tip of Spoon	--	240.0	
8	18	W/M	11			2.5-3.5	4.0	
9	10	M	8		Gray Clayey SILT (CL-ML), Grades to Very Stiff, Silty Clay, Trace Fine to Coarse Sand and Gravel			
				20	Stiff, Gray Silty CLAY (CL-ML), Trace Fine to Coarse Sand and Gravel	2.5-3.0		
					End of Boring at 22.5 ft			
					Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			
				25				
				30				

**MONTGOMERY  
WATSON**

**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. **SB144**  
 Job No. 4077.0075  
 Sheet 1 of 2  
 Surface Elevation 639.7  
 Northing: 6996.0  
 Easting: 5565.6

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Gray Slag Gravel and Fine Sand (FILL)			
1		M			Split Spoon Refusal, Drilled to 3.5 ft, Soil Cuttings were Brown SAND (SP) at 1.0 ft, Green/Gray Sand at 2.0 ft, Black Sand at 3.0 ft	--	0.0	
2	16	M	14		Crushed Grayish Green Gravel to 3.8 ft, Then into Black Fine SAND (SP), Musty Odor Present	--	1708.0	
3	18	W	8		Dark Olive Gray/Brown Fine SAND (SP), Swampy, Musty Odor Present	--	333.0	
4	16	W	7		Olive Gray Brown Fine SAND (SP), Grades into Black Brown, Oily Stained, Fine to Coarse Sand at 9.5 to 9.8 ft and from 10.2 to 10.5 ft, Solvent Oily Odor Present	--	1867.0	Field analysis for VOCs and PCBs
5	18	W	8		Olive Gray Brown Fine SAND (SP), Grades into Black/Brown Oil Stained, Fine to Coarse Sand from 12.2 to 13.0 ft, Sheen Present	--	1860.0	Field analysis for PCBs
6	16	W	8		Dark Gray, Fine to Coarse SAND (SP), Black Stained Zone from 14.0 to 14.3 ft and 14.8 to 15.0 ft, Musty Odor Present	--	324.0	

**WATER LEVEL OBSERVATIONS**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling     
 Depth to Water     
 Depth to Cave in   

**GENERAL NOTES**

Start 2/6/96 End 2/6/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 2 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Still Bottoms/Treatment Lagoon

Location Griffith, Indiana

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

Boring No. **SB144**

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 639.7

Northing: 6996.0

Easting: 5565.6

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	14	W	13		Dark Gray Fine to Coarse SAND (SP), Grades into Gray Brown Fine Sand at 17.0 ft, Musty Sweet Propane Like Odor Present	--	181.0	
8	20	W/M	8		Dark Gray Brown, Fine to Coarse SAND and GRAVEL (SP)		535.0	
				20	Hard Gray Brown Silty CLAY (CL-ML), Trace Fine to Coarse Sand at 19.7 ft	4.5		
9	18	M	8		Hard, Gray Brown Silty CLAY (CL-ML)	>4.5		
				25	End of Boring at 22.5 ft			
				30	Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			

**MONTGOMERY  
WATSON**

**LOG OF TEST BORING**

 Project American Chemical Service, Inc.
Still Bottoms/Treatment Lagoon

 Location Griffith, Indiana

 Boring No. **SB149**

 Job No. 4077.0075

 Sheet 1 of 2

 Surface Elevation 638.2

 Northing: 6833.6

 Easting: 5764.9

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Gray Slag, Gravel (FILL)			
1	12	M	6		Dark Brown, Fine SAND (SP), Grades into Gray/Black Fine Sand, Musty Solvent Odor Present	--	216.0	
					Dark Gray to Gray Fine SAND (SP), Little Silt, Musty Solvent Odor Present			
2	14	M	6			--	145.0	
					Dark Gray to Gray Brown Fine SAND (SP), Sweet Odor, Little Black Staining from 6.5 to 6.8 ft			
3	16	W	6		Grayish Green/Brown, Fine to Coarse SAND and Fine GRAVEL (SP), Musty Odor Present	--	313.0	Field analysis for PCBs
					Dark Olive Brown Fine to Coarse SAND (SP), Fine Gravel, Musty Odor	--	465.0	Field analysis for VOCs and PCBs
4	16	W	7					
					Gray, Olive Brown Fine SAND (SP), Musty Sulfur Odor Present	--	218.0	
5	20	W	11		Black Stained Fine SAND (SP) at 16.8 ft, Musty Sulfur Like Odor Present			
						--	75.0	
6	20	W	11					

**WATER LEVEL OBSERVATIONS**

 While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling         
 Depth to Water         
 Depth to Cave in       
**GENERAL NOTES**

 Start 2/12/96 End 2/12/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 4 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

JA077Gint40770 ID: CHICAGO



**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Still Bottoms/Treatment Lagoon

Location Griffith, Indiana

Boring No. **SB149**

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 638.2

Northing: 6833.6

Easting: 5764.9

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7		W	14		Dark Gray, Fine to Coarse SAND (SP) to 19.5 ft, Musty Odor Present	--	0.0	
8	20	W/M	10			--	11.0	
				20	Stiff to Very Stiff, Gray, Clayey SILT to Silty CLAY (CL-ML)	3.0-4.5		
9	20	M	11		Stiff, Gray Clayey SILT (CL-ML)	2.5	0.0	
				25	End of Boring at 23.0 ft  Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			
				30				

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

Boring No. **SB150**  
 Job No. 4077.0075  
 Sheet 1 of 2  
 Surface Elevation 639.0  
 Northing: 6452.9  
 Easting: 5749.4

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	TYPE	Rec. (in.)	Mois- ture	N Value	Depth (ft.)	qu (qa) (tsf)	PID (ppm)	Remarks
					Brown Sand, Gray Slag, Gravel (FILL)			
1		4	M	N/A	Brown, Fine to Coarse SAND and GRAVEL (FILL), Split Spoon Refusal	--	0.0	
2		16	M	6	Yellow Brown, Fine to Coarse SAND and GRAVEL (FILL), Some Olive Gray Staining from 4.5 to 5.5 ft	--	3.0	
3		16	M/W	5	Olive Gray to Dark Silver-Gray Stained, Fine to Coarse SAND and GRAVEL (FILL), Creosote Like Odor	--	1648.0	Field analysis for VOCs and PCBs
4		10	W	5	Olive Gray to Dark Silver-Gray Stained, Fine to Coarse SAND and GRAVEL (FILL), Creosote Like Odor	--	79.0	
5		10	W	6	Dark Gray, Fine to Coarse SAND (SP) to 12.0 ft, Grades into Gray Brown Fine Sand, Trace Medium to Coarse Sand, Slight Solvent Odor	--	40.0	
6		14	W	7	Gray Brown, Fine to Coarse SAND (SP), Musty Odor	--	50.0	

**WATER LEVEL OBSERVATIONS**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling     
 Depth to Water     
 Depth to Cave in   

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**GENERAL NOTES**

Start 2/13/96 End 2/13/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 2 1/4" I.D. HSA

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
 Location Griffith, Indiana

Boring No. **SB150**  
 Job No. 4077.0075  
 Sheet 2 of 2  
 Surface Elevation 639.0  
 Northing: 6452.9  
 Easting: 5749.4

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	18	W	11		Gray Brown, Fine to Coarse SAND (SP), With Fine Gravel, Propane-Like Odor	--	0.0	
8	18	W	9			--	7.0	
9	22	M	7		Stiff to Very Stiff, Gray Brown, Silty CLAY (CL-ML), Trace Fine to Coarse Sand and Gravel	2.0-4.0	0.0	
					End of Boring at 23.0 ft			
					Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			

**MONTGOMERY  
WATSON****LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Still Bottoms/Treatment Lagoon  
Location Griffith, Indiana

Boring No. **SB151**  
Job No. 4077.0075  
Sheet 1 of 2  
Surface Elevation 638.8  
Northing: 6763.8  
Easting: 5890.1

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Gray Crushed Gravel, Slag (FILL)			
1	12	M	14		Yellow Brown, Fine SAND (SP), Little Fine to Coarse Sand	--	7.0	
2	22	M	6		Orange Brown, Fine to Coarse SAND (SP), Little Fine Gravel, Grades to Olive Gray Staining at 4.2 ft	--	11.0	
3	20	M/W	6	5	Black Stained, Fine to Coarse SAND and GRAVEL (GP), Becomes Olive Gray Stained, Fine to Coarse Gravel at 6 ft, Solvent Odor near Black Staining	--	15.0	Field analysis for PCBs
4	22	W	6		Gray/Green/Brown Stained, Fine to Coarse SAND and GRAVEL (GP), Grades into Dark Brown Fine to Medium Sand at 8.0 ft	--	30.0	
5	12	W	5	10	Olive Brown, Fine to Coarse SAND and GRAVEL (GP), Grades into Dark Gray, Fine to Coarse Sand and Fine Gravel, Swampy Odor	--	166.0	Field analysis for PCBs
6	20	W	10		Gray Brown, Fine to Coarse SAND and GRAVEL (GP), Grades into Gray Brown, Fine to Medium Sand at 12.0 ft, Little Black Staining and Swampy Odor	--	180.0	
7	20	W		15	Gray Brown, Fine to Coarse SAND and Fine GRAVEL (GP) to 14.0 ft, Grades into Gray Brown Fine Sand	--	39.0	

**WATER LEVEL OBSERVATIONS**

While Drilling    ft. Upon Completion of Drilling    ft.  
Time After Drilling         
Depth to Water         
Depth to Cave in       

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**GENERAL NOTES**

Start 2/13/96 End 2/13/96  
Driller E & F Chief GH Rig CME 55  
Logger DAP Editor PMS  
Drill Method 4 1/4" I.D. HSA

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Still Bottoms/Treatment Lagoon

Location Griffith, Indiana

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

Boring No. **SB151**

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 638.8

Northing: 6763.8

Easting: 5890.1

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
8	20	W	18		Gray Brown, Fine to Coarse SAND and GRAVEL (GP), Grades into Gray Brown Fine Sand, Black Stained from 16.5 to 17.0 ft	--	40.0	
9	18	W	21		Gray, Fine to Coarse SAND and GRAVEL (GP), Musty Odor Present	--	19.0	
10	20	W/M	18		Gray, Fine to Coarse SAND (SP), Very Strong Sour Odor Present	--	3251.0	Field analysis for VOCs
				20	Hard, Gray Brown, Clayey SILT to Silty CLAY (CL-ML), Black Staining Present	> 4.0		
11	20	M			Very Stiff, Gray Brown, Clayey SILT to Silty CLAY (CL-ML), Very Strong Sour Odor in Clay	3.0		
12	24				Gravel in Shelby Tube	--		
				25	End of Boring at 25.0 ft			
					Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			
				30				

**MONTGOMERY  
WATSON**

**LOG OF TEST BORING**

Project **American Chemical Service, Inc.**  
**Still Bottoms/Treatment Lagoon**  
 Location **Griffith, Indiana**

Boring No. **SB152**  
 Job No. **4077.0075**  
 Sheet **1** of **2**  
 Surface Elevation **639.2**  
 Northing: **6606.8**  
 Easting: **5818.6**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Gray Slag, Gravel Followed by Brown Fine Sand (FILL)			
1	22	M	12		Light Brown Fine SAND (SP), Front Line at 2.5 ft	--	1.0	
2	24	M/W	4		Light Brown Fine SAND (SP), Some Black Streaks, Grades into Orange Brown, Fine to Coarse SAND and GRAVEL from 4.5 to 5.0 ft	--	1.0	
3	22	W	4	5	Orange Brown to Brown, Fine to Coarse SAND and Fine GRAVEL (SP/GP), Some Rust Staining	--	1.0	
4	12	W	2		Gray, Olive/Green, Fine to Coarse SAND and GRAVEL (SP/GP), Grades to Black Staining from 8.0 to 9.0 ft, Solvent/Gasoline Like Odor Present	--	250.0	Field analysis for PCBs
5	20	W	10	10	Grades into Dark Gray Fine SAND (SP) at 10.0 ft, Solvent Odor Present	--	1395.0	Field analysis for PCBs
6	18	W	15		Dark Gray/Green, Fine to Coarse SAND and GRAVEL (SP/GP) to 11.5 ft Gray Brown Fine SAND and GRAVEL (SP/GP) from 11.5 to 12.0 ft	--	143.0	
7	16	W	9		Gray Brown Fine SAND (SP), Propane Like Odor Present Gray Green Fine to Coarse SAND and GRAVEL (SP/GP), Gray Brown Fine Sand, Propane Like Odor Present	--	74.0	
				15				

**WATER LEVEL OBSERVATIONS**

While Drilling ☒ ft. Upon Completion of Drilling ☒ ft.  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**GENERAL NOTES**

Start **2/13/96** End **2/13/96**  
 Driller **E & F** Chief **GH** Rig **CME 55**  
 Logger **DAP** Editor **PMS**  
 Drill Method **4 1/4" I.D. HSA**

# MONTGOMERY WATSON



## LOG OF TEST BORING

Project American Chemical Service, Inc.

Still Bottoms/Treatment Lagoon

Location Griffith, Indiana

Boring No. **SB152**

Job No. **4077.0075**

Sheet **2 of 2**

Surface Elevation **639.2**

Northing: **6606.8**

Easting: **5818.6**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
8	20	W	13		Gray Brown Fine SAND (SP), Some Fine to Coarse Gravel from 15.0 to 15.5 ft	--	88.0	
9	22	W	13		Gray Brown, Fine to Coarse SAND (SP), Propane Like Odor, 1 in. Clay Seam from 18.9 to 19.0 ft	--	69.0	
10	20	W	24	20-	Gray Brown, Fine to Coarse SAND (SP), Trace Silt and Clay, Propane Like Odor Present	--	4.0	
11	22	W	23		Stiff, Gray Clayey SILT (CL-ML) to SILT, Slight Sour Odor Present	2.0	0.0	
						2.5		
				25-	End of Boring at 23.0 ft			
					Borehole Backfilled with Bentonite Cement Grout. Topped with 6 inches of Gravel.			
				30-				

**Location**                      **Griffith, Indiana**

Easting: 4984.8

JM4077\Gint\40770 ID: CHICAGO



**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Off-Site Contaminant Area  
 Location Griffith, Indiana

Boring No. SB202  
 Job No. 4077.0075  
 Sheet 1 of 1  
 Surface Elevation 640.4  
 Northing: 6059.9  
 Easting: 5011.5

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Dirt/Grass Surface over Silty Sand (FILL)			
1	12	M	31		Gravel, Wood, Glass, Silt, Clay and Sand (FILL)			
2		M	6		Waste			
3			52/3"		Waste: Split Spoon was wet at 8 ft			
					Auger Refusal and End of Boring at 7.0 ft			
					Abandoned Borehole with Bentonite Cement Grout. Topped at the Surface with Bentonite Chips.			

**WATER LEVEL OBSERVATIONS**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling     
 Depth to Water     
 Depth to Cave in   

**GENERAL NOTES**

Start 1/17/96 End 1/17/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

# MONTGOMERY WATSON



## LOG OF TEST BORING

Project American Chemical Service, Inc.

Off-Site Contaminant Area

Location Griffith, Indiana

Boring No. SB202A

Job No. 4077.0075

Sheet 1 of 2

Surface Elevation 639.9

Northing: 6077.4

Easting: 5014.5

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Blind Drilled to 6 ft			
1	12	W	13		WASTE: Paper, Plastic, Trace silt		0.0	
2	12	W	5		Dark Gray Brown, Silty, Fine to Medium SAND (SP)		0.5	
3	18	W	16		Trace to Some Fine GRAVEL and Coarse SAND (SP) from 11 to 11.5 ft		5.0	
4	24	W	7				11.0	Field analysis for VOCs and PCBs

### WATER LEVEL OBSERVATIONS

While Drilling 8.5 ft. Upon Completion of Drilling    ft.  
 Time After Drilling     
 Depth to Water     
 Depth to Cave in   

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

### GENERAL NOTES

Start 1/17/96 End 1/18/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. SB202A

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 639.9

Northing: 6077.4

Easting: 5014.5

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
5	24	W	12		Brown Gray, Silty, Fine to Medium SAND (SP), Trace Fine to Medium Gravel  1/2 in. Thin Gray Clay Stringers from 17.5 to 18 ft		6.0	Field analysis for VOCs and PCBs
6	24	W	15		Brown Gray, Silty Fine SAND (SP), Grading into Silt at 19.5 ft, Trace Gray Clay		0.0	
				20	Gray Clayey SILT (ML)			
					Gray Fine SAND (SP)			
7	24	M	20		Negative Hydrophobic Dye Test		0.0	
					Brown Gray CLAY (CL)	4.0		
				25	End of Boring at 23.0 ft  Abandoned Borehole with Bentonite Cement Grout. Topped at the Surface with Bentonite Chips.			
				30				

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Off-Site Containment Area  
 Location Griffith, Indiana

Boring No. SB203  
 Job No. 4077.0075  
 Sheet 1 of 2  
 Surface Elevation 641.0  
 Northing: 6029.0  
 Easting: 5011.5

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Grass Surface Over Municipal REFUSE			
1		W			REFUSE			
2		W	9		REFUSE: Wood, Paper, Grass, Plastic			
3		W	13		REFUSE			
4		W	26		REFUSE: Trace Paper and Plastic			
5	18	W	19		REFUSE: Black Clay Mixed with Wood and Paper		1.0	
					Gray, Silty Fine SAND (SM)			
					Light Brown, Silty, Fine to Medium SAND (SM), Trace Coarse Sand and Fine Gravel			
6	12	W	17		Brown, Silty Fine SAND (SM)		42.0	Field analysis for VOCs and PCBs

**WATER LEVEL OBSERVATIONS**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling     
 Depth to Water     
 Depth to Cave in   

**GENERAL NOTES**

Start 1/18/96 End 1/18/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

Boring No. SB203

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 641.0

Northing: 6029.0

Easting: 5011.5

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	24	W	17		Brown, Silty Fine SAND (SM)		37.0	Field analysis for VOCs and PCBs
8	24	W	24		Brown, Silty Fine SAND (SM)		31.0	
				20				
9	24	W	21				21.0	
					Stiff, Gray Silty CLAY (CL)	4.0		
					End of Boring at 23.0 ft			
				25	Abandoned Borehole with Bentonite Cement Grout. Topped at the Surface with Bentonite Chips.			
				30				

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

Boring No. **SB204**

Job No. **4077.0075**

Sheet **1 of 2**

Surface Elevation **641.9**

Northing: **5964.5**

Easting: **5012.0**

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					REFUSE: Black Clayey Soil with Wood, Plastic and Paper			
1		M			REFUSE: Wood, Moved South 2 ft			Two attempts made to move away from refusal
2		M	43		REFUSE			
3		M	7		REFUSE			
4		M	15		REFUSE			
5	24	W	27		Brown, Silty, Fine to Medium SAND, Trace Fine to Coarse Gravel (SM)			
6	24	W	11		Brown, Silty, Fine to Medium SAND, Trace Fine to Coarse Gravel (SM)		8.0	Field analysis for VOCs and PCBs

**WATER LEVEL OBSERVATIONS**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling     
 Depth to Water     
 Depth to Cave in   

**GENERAL NOTES**

Start 1/18/96 End 1/18/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. SB204

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 641.9

Northing: 5964.5

Easting: 5012.0

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	24	W	17		Gray, Silty, Fine to Medium SAND (SM)		17.0	Field analysis for VOCs and PCBs
8	24	W	19		Gray, Silty, Fine to Medium SAND (SM), Trace Medium to Coarse Gravel		5.0	
9	24	W	20		Gray Silty CLAY (CL-ML)	3.5-4.0	3.0	
					End of Boring at 23.0 ft			
					Abandoned Borehole with Bentonite Cement Grout. Topped at the Surface with Bentonite Chips.			

# MONTGOMERY WATSON



## LOG OF TEST BORING

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. SB205

Job No. 4077.0075

Sheet 1 of 2

Surface Elevation 643.4

Northing: 5913.8

Easting: 5014.2

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					REFUSE: Grass Surface			
1		M	39		REFUSE: Brown, Silty, Fine to Medium Sand with Some Debris		45.0	
2	18	W	5	5	Brown, Silty, Fine to Medium SAND (SM)		592.0	Field analysis for VOCs
3	18	W	4		Grades to Fine, Silty SAND (SM), Stained Black		1062.0	Field analysis for VOCs
4	18	W	4		Brown, Silty, Fine SAND (SM)		530.0	
5	20	W	11		Brown Stained, Silty, Fine SAND (SM), Trace Clay		25.0	
					Rust Coloration at 12 ft			
6	18	W	19		Grades to Gray, Silty, Fine to Medium SAND (SM)		27.0	

### WATER LEVEL OBSERVATIONS

While Drilling 3.5 ft. Upon Completion of Drilling 3.5 ft.  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

### GENERAL NOTES

Start 1/19/96 End 1/19/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. SB205

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 643.4

Northing: 5913.8

Easting: 5014.2

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Fine to Coarse Sand and Gravel from 15 to 15.5 ft			
7	18	W	26		Gray, Silty, Fine SAND (SM), No Black Staining Present		11.0	
8	18	W	12		Gray, Silty, Fine SAND (SM), No Black Staining Present		88.0	
9	24	W/M	19		Gray, Silty, Fine to Medium SAND (SM)		62.0	
					Gray, Clayey SILT (ML), Trace Fine Sand			
					Gray, Silty CLAY (CL-ML)			
10		M	15			4.0 3.5	39.0	
					End of Boring at 25.5 ft			
					Abandoned Borehole with Bentonite Cement Grout. Topped at the Surface with Bentonite Chips.			

# MONTGOMERY WATSON



## LOG OF TEST BORING

Project American Chemical Service, Inc.  
Off-Site Containment Area  
 Location Griffith, Indiana

Boring No. SB205A  
 Job No. 4077.0075  
 Sheet 1 of 2  
 Surface Elevation 646.0  
 Northing: 5930.6  
 Easting: 4988.6

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
1	24	M	46		FILL: Gravel, Sand, Clay and Silt		20.0	
2	12	M	15				6.0	
3	18	M	34		FILL: Brown, Silty, Fine to Coarse Sand, Trace Gravel and Clay			
4	12	M	6		FILL: Dark Brown, Silty, Fine to Coarse Sand, Some Fine to Medium Gravel and Clay Coarse Gravel Lens from 7.5 to 8 ft		6.0	
5		M/W	8		FILL: Dark Brown, Silty Clay and Sand and Gravel Gray/Blue Clay from 9 to 9.5 ft Wood/Paper Mixed with Clay and Silt from 9.5 to 10.5 ft		50.0	Field analysis for PCBs
6	3	M/W	17		FILL: Wood and Fabric in Tip of Spoon, No Recovery		0.0	
					FILL: Wood in Split Spoon, Poor Recovery		13.0	

### WATER LEVEL OBSERVATIONS

While Drilling 14.0 ft. Upon Completion of Drilling 14.0 ft.  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

### GENERAL NOTES

Start 1/24/96 End 1/24/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. **SB205A**

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 646.0

Northing: 5930.6

Easting: 4988.6

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	6	W	7		FILL: Brown Silt, Clay, Gravel with Wood Pieces, Poor Recovery		5.0	
					Dark Brown, Silty, Fine to Medium SAND (SM)			
8	2	W	5		Wood in Split Spoon, Poor Recovery		0.0	
				20				
9	6	W	21				60.0	
10	6	W	17		Gray, Silty, Fine to Medium SAND (SM)		160.0	Field analysis for VOCs and PCBs
				25				
					Gray, Silty CLAY (CL-ML)			
11	12	M	27		Gray, Silty, Fine to Medium SAND (SM)		10.0	
					Stiff, Gray, Silty CLAY (CL-ML), Trace Fine to Coarse Sand			
12	18	M	18			4.0	0.0	
				30				
					End of Boring at 30.0 ft			
					Abandoned Borehole with Bentonite Cement Grout. Topped Surface with Bentonite Chips.			

# MONTGOMERY WATSON



## LOG OF TEST BORING

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. **SB206**

Job No. **4077.0075**

Sheet **1** of **2**

Surface Elevation **644.6**

Northing: **5856.2**

Easting: **5013.4**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					REFUSE: Grass/Gravel Surface, Silty Fine to Medium Sand, Trace Silt, Clay and Fine Gravel			
1	24	M	16		Thin Paper Layer at 2.8 ft		99.0	3" split spoon utilized for sample collection this borehole
2	24	M	15		Brown Gray, Silty, Fine to Medium SAND (SP) Fine to Coarse SAND and GRAVEL Layer (SP/GP) Brown Gray, Silty, Fine to Medium SAND (SM)		161.0	
3	24	W	7	5			330.0	Field analysis for VOCs and PCBs
4	20	M	9		Light Brown, Fine to Medium SAND (SP) Dark Brown with Light Brown Bands, Silty, Fine to Medium SAND (SP)		192.0	Field analysis for VOCs and PCBs
5	18	M	12				192.0	
6	20	M/W	25	10	Dark Brown, Silty, Fine to Medium SAND (SM), Trace Clay Brown/Light Gray, Silty, Fine to Medium SAND (SM)		70.0	
7	18	W	15		Brown/Light Gray, Silty, Fine to Medium SAND (SM)		7.0	
				15				

### WATER LEVEL OBSERVATIONS

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling     
 Depth to Water     
 Depth to Cave in   

### GENERAL NOTES

Start 1/22/96 End 1/22/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

Boring No. **SB206**

Job No. **4077.0075**

Sheet **2 of 2**

Surface Elevation **644.6**

Northing: **5856.2**

Easting: **5013.4**

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
8	20	W	12				7.0	
9	18	W	28		Gray, Silty, Fine to Coarse SAND and GRAVEL (SM/GM)		23.0	
					Gray, Silty, Fine to Coarse SAND (SM)			
10	20	W	5		Sand and Gravel Lens from 19 to 19.5 ft		38.0	
				20-				
11	24	W	18		Gray, Silty, Fine to Medium SAND (SM), Trace Gravel		7.0	
					1/2" Silt Seam at 22.5 ft 1" silt Seam at 22.8 ft			
12	24	W/M	17		Grades to Fine to Coarse Silty SAND and CLAY		1.0	
					Gray Silty CLAY (CL)	> 4.0		
13				25-	CLAY (CL)			
					End of Boring at 27.5 ft			
					Abandoned Borehole with Bentonite Cement Grout. Topped at the Surface with Bentonite Chips.			
				30-				

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

Boring No. **SB207**

Job No. **4077.0075**

Sheet **1** of **2**

Surface Elevation **646.9**

Northing: **5801.1**

Easting: **4978.0**

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Grass/Gravel Surface			
1	18	M	25		REFUSE: Black Silty and Clayey Sand and Gravel with Cinders, Paper and Wood		0.0	
2	6	M	5		REFUSE: Paper, Plastic, Mostly Cinders, Sand and Gravel		0.0	
3	18	M	6		Dark Gray to Brown, Silty, Fine to Medium SAND (SM)		7.0	
4	2	M	9		Color Change to Dark Brown and Black at 7.8 ft			
					Black Silty SAND, Wood in Split Spoon Shoe, Plastic Sheeting Also (SM)		0.0	
5	18	M/W	23					Difficulty retrieving spoon
6	18	W	23		Gray, Silty Fine SAND (SM), Changes to Dark Gray at 14.5 ft, Black Staining at 14.8 and 15.2 ft		38.0	Field analysis for VOCs and PCBs

**WATER LEVEL OBSERVATIONS**

While Drilling  $\nabla$  12.0 ft. Upon Completion of Drilling  $\nabla$  \_\_\_\_\_ ft.  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

**GENERAL NOTES**

Start 1/22/96 End 1/22/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. **SB207**

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 646.9

Northing: 5801.1

Easting: 4978.0

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	18	W	33		Brown, Silty, Fine to Coarse SAND (SM), Trace Fine Gravel		84.0	Field analysis for VOCs and PCBs
					Brown/Gray Silty, Fine to Medium SAND (SM)			
8	15	W	24		Gray, Silty, Fine to Medium SAND (SM)		23.0	
				20				
9	18	W	28				69.0	Field analysis for VOCs and PCBs
					1" Gray Silt in Tip of Spoon			
10	12	W	24		Gray, Silty, Fine to Medium SAND (SM)		23.0	
				25				
					Gray, Clayey SILT (ML), Grades into Gray, Silty Sand			
11	18	W/M	28				33.0	
					Gray CLAY (CL)	4.0		
12		M				>4.0	0.0	
				30				
					End of Boring at 30.0 ft			
					Abandoned Borehole with Bentonite Cement Grout. Topped Surface with Bentonite Chips.			

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Off-Site Containment Area  
 Location Griffith, Indiana

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

Boring No. SB208  
 Job No. 4077.0075  
 Sheet 1 of 2  
 Surface Elevation 646.8  
 Northing: 5763.9  
 Easting: 4960.8

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
1	18	M	5		Gravel/Grass Surface with Brown Soil Over Black, Silty and Clayey, Fine to Medium Sand (FILL) FILL: Dark Gray/Brown/Black CLAY with Paper, Fabric and Plastic, Trace Cinders and Slag		16.0	
2	18	M	39		FILL: Wood, Cinders, Black, Silty Clay, Some Fine to Medium Gray Sand		116.0	
3	7	M/W	26		FILL: Wood, Trace to Some Black, Fine to Coarse Sand, Poor Recovery		83.0	
4	2	W	13		FILL: Wood and Clay, Poor Recovery		116.0	
5	16	W	13		Light to Dark Brown, Silty Fine SAND (SM)		3810.0	Field analysis for VOCs and PCBs
6	18	W	21		Light to Dark Brown, Silty Fine SAND (SM)		83.0	

**WATER LEVEL OBSERVATIONS**

Time After Drilling 7.5 ft. Upon Completion of Drilling 7.5 ft.  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**GENERAL NOTES**

Start 1/23/96 End 1/23/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA



**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

Boring No. SB208

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 646.8

Northing: 5763.9

Easting: 4960.8

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	18	W	21		Gray, Silty, Fine to Medium SAND (SM), Trace to Some, Fine to Medium Gravel from 16 to 16.5 ft		249.0	
8	20	W	17		Fine to Coarse SAND and Fine GRAVEL (SP/GP) Dark Brown/Gray, Silty, Fine to Medium SAND (SM)		250.0	
9	24	W	18		Fine to Coarse SAND and Fine GRAVEL (SP/GP), Trace Silt Gray/Brown, Silty, Fine to Medium SAND (SM), Trace Clay		50.0	
10	18	W	21		Gray, Silty, Fine to Medium SAND (SM), Grades to Fine, Silty Sand Clayey Silt/Silty CLAY in Tip of Spoon Gray Silty CLAY (CL-ML)		830.0	Field analysis for VOCs and PCBs
11	19	W	19			3.5->4.0	7.0	
					End of Boring at 28.0 ft Abandoned Borehole with Bentonite Cement Grout. Topped at the Surface with Bentonite Chips.			

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Off-Site Containment Area  
 Location Griffith, Indiana

Boring No. SB209  
 Job No. 4077.0075  
 Sheet 1 of 2  
 Surface Elevation 647.4  
 Northing: 5715.5  
 Easting: 4942.1

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Grass/Gravel/Soil Surface			
1	18	M	4		FILL: Brown, Clayey Silt, Glass, Paper, Plastic		0.0	
2	18	M	10		FILL: Black, Silty, Fine to Medium Sand, Paper and Plastic		0.0	
3	4	M/W	5		FILL: Wood, Paper, Plastic, etc.		0.0	
4	2	W	13		FILL: Wood Only, No Sample Collected, Not Enough Volume		0.0	
5		W	42		No Recovery - Refuse in tip of Spoon		0.0	
6		W	14		Fabric in Tip of Spoon - No Recovery		0.0	

**WATER LEVEL OBSERVATIONS**

/hile Drilling 12.0 ft. Upon Completion of Drilling 12.0 ft.  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

**GENERAL NOTES**

Start 1/23/96 End 1/23/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. **SB209**

Job No. **4077.0075**

Sheet **2** of **2**

Surface Elevation **647.4**

Northing: **5715.5**

Easting: **4942.1**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	14	W	35		Dark Gray, Silty, Fine to Coarse SAND and Fine Gravel (SM)		149.0	Field analysis for VOCs and PCBs
					Brown Staining from 17 to 17.3 ft			
8	18	W	26		Dark Brown/Gray, Silty, Fine to Coarse SAND and Fine GRAVEL (SM)		150.0	Field analysis for VOCs and PCBs
9	12	W	21		Dark Brown/Gray, Silty, Fine to Coarse SAND and Fine GRAVEL (SM)		140.0	
10	12	W	21		Gray, Silty, Fine to Medium SAND (SM), Trace to Little Clay, Silt Increases with Depth		10.0	
11	18	W	21		1 in. Thin Silt Seam from 27 to 27.2 ft Brown, Clayey Silt in Tip of Spoon		0.0	
12	20	M	21		Gray, Silty CLAY, Trace Fine Gravel (CL-ML)	4.0	0.0	
				30	End of Boring at 30.0 ft			
					Abandoned Borehole with Bentonite Cement Grout. Topped Surface with Bentonite Chips.			

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. **SB210**

Job No. 4077.0075

Sheet 1 of 2

Surface Elevation 647.2

Northing: 5690.0

Easting: 4988.9

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
1	2	M	14		REFUSE: Wood and Paper in Spoon		5.0	
					REFUSE: Plastic and Wood			
2	3	M	17				0.0	
				5				
3	2	M	4		REFUSE: Wood and Paper, Trace Clay		23.0	
4	3	M	12		REFUSE: Black, Trace to Little, Fine to Medium Sand		350.0	
				10				
5	12	M/W	18		Light Brown, Fine to Coarse SAND (SP), Some Fine Gravel		122.0	
				▽				
6	12	W	14		Gray, Silty, Fine to Medium SAND (SM)		80.0	
				15				

**WATER LEVEL OBSERVATIONS**

While Drilling ▽ 12.0 ft. Upon Completion of Drilling ▽ \_\_\_\_\_ ft.  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

**GENERAL NOTES**

Start 1/23/96 End 1/23/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Off-Site Containment Area  
 Location Griffith, Indiana

Boring No. SB210  
 Job No. 4077.0075  
 Sheet 2 of 2  
 Surface Elevation 647.2  
 Northing: 5690.0  
 Easting: 4988.9

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7		W	10		Gray, Silty, Fine to Coarse SAND (SM), Trace Fine to Coarse Gravel		283.0	Field analysis for VOCs and PCBs
8		W	17		Gray Brown, Silty, Fine to Medium SAND (SM)		480.0	Field analysis for VOCs and PCBs
				20	Fine to Coarse, Fine to Medium GRAVEL (GP), Black Staining			
		W	25		Light Brown, Silty, Fine to Medium SAND (SM) Gray, Silty, Fine to Coarse SAND (SM)		150.0	
					Brown, Silty, Fine to Medium SAND (SM)			
10		W	12				0.0	
				25	1/2 in. Silt Seam at 24.5 and 24.6 ft			
11		W	19		Gray, Silty CLAY (CL-ML)		5.0	
						4.0		
					End of Boring at 28.0 ft			
				30	Abandoned Borehole with Bentonite Cement Grout. Topped at the Surface with Bentonite Chips.			

# MONTGOMERY WATSON



## LOG OF TEST BORING

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. **SB211**

Job No. 4077.0075

Sheet 1 of 2

Surface Elevation 651.0

Northing: 5663.6

Easting: 5186.0

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					FILL: Brown to Black, Silty, Fine to Coarse Sand and Gravel, Some Clay, Cinders, Broken Glass			
1	18	M	5				33.0	
					FILL: Brown to Black, Silty, Fine to Coarse Sand and Gravel, Some Clay, Cinders, Broken Glass			
2	14	M	2				73.0	
				5	Dark Brown to Gray, Silty, Fine to Coarse SAND (SM), Some Black Staining at 5 ft			
3	14	M	4		Light Brown, Silty, Fine to Medium SAND (SM)		20.0	
4	18	M/W	5	▽			60.0	Field analysis for VOCs and PCBs
				10	Grades to Gray, Silty, Fine to Coarse SAND (SM), Little to Some Clay from 10 to 10.3 ft			
5	17	W	7		Light Brown, Silty, Fine to Medium SAND (SM), Some Gray Coloration		33.0	
6	18	W	8		Light Brown, Silty, Fine to Medium SAND (SM), Some Gray Coloration, Propane-like Odor		5.0	
				15				

### WATER LEVEL OBSERVATIONS

While Drilling ▽ 9.0 ft. Upon Completion of Drilling ▽ \_\_\_\_\_ ft.  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

### GENERAL NOTES

Start 1/24/96 End 1/24/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. SB211

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 651.0

Northing: 5663.6

Easting: 5186.0

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Light Brown, Silty, Fine to Medium SAND (SM), Some Gray Coloration			
7	24	W	10		Trace to Some, Fine to Coarse GRAVEL (GP) Light Brown, Silty, Fine to Coarse SAND (SM)		73.0	
8	15	W	7		Black Stained, Medium to Coarse SAND (SP) to Fine Gravel, Trace Silt Gray, Medium to Coarse, Silty SAND (SM)		233.0	Field analysis for VOCs and PCBs
9	20	W	16		Light Gray, Silty, Fine SAND (SM), Trace Medium to Coarse Sand		180.0	
10	18	W	26		Light Gray, Silty, Fine SAND (SM), Trace Medium to Coarse Sand		73.0	
11	24	W	22		Light Gray, Silty, Fine to Medium SAND (SM)  Gray Clayey Silt from 27.8 to 28 ft		33.0	
12	18	W			Gray Silty CLAY (CL-ML)	> 4.0	0.0	
				30	End of Boring at 30.0 ft  Abandoned Borehole with Bentonite Cement Grout. Topped Surface with Bentonite Chips.			

**MONTGOMERY  
WATSON**

**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Off-Site Containment Area  
 Location Griffith, Indiana

Boring No. SB212  
 Job No. 4077.0075  
 Sheet 1 of 2  
 Surface Elevation 649.4  
 Northing: 5758.7  
 Easting: 5453.6

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					FILL: Gravel Surface, Black, Silty, Clayey, Fine to Coarse Sand and Gravel			
1	24	M	23		Light Brown/Rust Silty Fine to Medium SAND (SM)		0.0	3" split spoon utilized for this soil boring
2	24	M	15		Dark Brown Change in Color at 3 ft		0.0	
3	18	M/W	9	5	2 in. Silt Seam		0.0	
4	18	M	12		Clayey Silt from 7 to 7.3 ft Light Brown/Rust Silty Fine to Medium SAND (SM)		0.0	
5	24	M	14	10	Light Brown/Rust Silty Fine to Medium SAND (SM)		0.0	
6	24	M	17		Dark Brown/Rust, Silty, Fine to Medium SAND (SM) Grading to Fine to Coarse Sand, Trace Fine Gravel		0.0	
7	18	W	22		Dark Brown, Silty, Fine to Medium SAND (SM)		0.0	
				15	Dark Brown, Silty, Fine to Coarse SAND (SM), Trace Clay and Gravel			

**WATER LEVEL OBSERVATIONS**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling         
 Depth to Water         
 Depth to Cave in       

**GENERAL NOTES**

Start 1/25/96 End 1/25/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. SB212

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 649.4

Northing: 5758.7

Easting: 5453.6

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
8	18	W	9		Dark Brown, Silty, Fine to Coarse SAND (SM), Trace Clay and Gravel		280.0	
9	18	W	11		Black, Silty, Fine to Coarse SAND (SM)		1440.0	
					Dark Gray, Silty, Fine to Coarse SAND and Fine Gravel (SM)			
10	12	W	16				726.0	Field analysis for VOCs and PCBs
				20	Black Stained, Fine to Coarse SAND (SM), Some Fine Gravel, Trace Coarse Gravel			
11	18	W	19		Grades to Light Gray in Color, Trace Clay		1486.0	
12	18	W	22				1788.0	Field analysis for VOCs
				25	Light Gray, Silty, Fine to Coarse SAND (SM)		515.0	
13	12	W	17					
14	18	W/M	23		Light Gray, Silty, Fine to Coarse SAND (SM)		302.0	
					Gray, Silty CLAY and Clayey SILT (CL-ML), Trace to Some, Fine to Coarse Sand			
15						>4.0	25.0	
				30	End of Boring at 30.0 ft			
					Abandoned Borehole with Bentonite Cement Grout. Topped Surface with Bentonite Chips.			

# MONTGOMERY WATSON



## LOG OF TEST BORING

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. **SB213**

Job No. **4077.0075**

Sheet **1** of **2**

Surface Elevation **653.1**

Northing: **5637.8**

Easting: **5388.9**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					FILL			
1	20	M	1		Light Brown, Silty, Fine to Medium SAND (SM)		0.0	
2	19	M	6		Light Brown, Silty, Fine to Medium SAND (SM)		0.0	
3	24	M	7		Light Brown, Silty, Fine to Medium SAND (SM)		0.0	
4	24	M/W	6		Light Brown, Silty, Fine to Medium SAND (SM)		0.0	
5	24	W	6		Rust Colored Banding Present from 11 to 13 ft		0.0	
6	24	W	7		Grades to Dark Brown, Silty, Fine to Medium SAND (SM)		0.0	

### WATER LEVEL OBSERVATIONS

While Drilling  $\nabla$  **13.0** ft. Upon Completion of Drilling  $\nabla$  \_\_\_\_\_ ft.  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

### GENERAL NOTES

Start 1/25/96 End 1/25/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP **850**  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

J4077/Gint4077Q ID: CHICAGO

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. SB213

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 653.1

Northing: 5637.8

Easting: 5388.9

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	18	W	4		Brown/Rust, Silty, Fine to Coarse SAND (SM), Some Fine to Coarse Gravel		0.0	
8	18	W	21				0.0	
				20	Light Brown, Silty, Fine to Coarse SAND and Fine GRAVEL (GS)			
9	18	W	16		Gray, Silty, Fine to Coarse SAND (SM), Trace Fine Gravel		199.0	
10	8	W	18				106.0	Field analysis for VOCs and PCBs
				25	Dark Gray, Silty, Fine to Coarse SAND (SM), Trace to Some, Fine to Coarse Gravel, Some Black Staining			
					Coarse Broken Limestone and Gravel, Poor Recovery			
11	15	W	27				199.0	Field analysis for VOCs
					Dark Gray, Silty, Fine to Medium SAND (SM)			
12	18	W	28				160.0	
					Coarse Gravel Present Thin Clay Seams (1/4") from 29 to 30 ft			
				30	CLAY (CL)			
					End of Boring at 31.0 ft Abandoned Borehole with Bentonite Cement Grout. Topped Surface with Bentonite Chips.			

**MONTGOMERY  
WATSON**

**LOG OF TEST BORING**

 Project American Chemical Service, Inc.
Off-Site Containment Area

 Location Griffith, Indiana

 Boring No. **SB214**

 Job No. **4077.0075**

 Sheet **1** of **2**

 Surface Elevation **647.2**

 Northing: **5946.4**

 Easting: **5523.4**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					TOPSOIL/Scrub Surface			
1	18	M	4		Light Brown, Silty, Fine to Medium SAND (SM) Some Rust Coloration		0.0	
2	24	M	9				0.0	
3	24	M	9		Slightly Lighter in Color		0.0	
4	24	M	15				0.0	
5	24	M	9		Light Brown, Silty, Fine to Coarse SAND (SM) with Trace to Little Fine Gravel  Trace Clay		0.0	
6	18	M/W	5				767.0	Field analysis for PCBs

**WATER LEVEL OBSERVATIONS**

 While Drilling  $\nabla$  14.5 ft. Upon Completion of Drilling  $\nabla$  \_\_\_\_\_ ft.  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

**GENERAL NOTES**

 Start 1/26/96 End 1/26/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

# MONTGOMERY WATSON



## LOG OF TEST BORING

Project American Chemical Service, Inc.  
Off-Site Containment Area  
 Location Griffith, Indiana

Boring No. **SB214**  
 Job No. 4077.0075  
 Sheet 2 of 2  
 Surface Elevation 647.2  
 Northing: 5946.4  
 Easting: 5523.4

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Gray with Brown Staining, Silty, Fine to Coarse SAND and Fine GRAVEL (SM/GM)			
7	12	W	12				480.0	Field analysis for VOCs
8	12	W	9		Gray, Silty, Fine to Coarse SAND and Fine GRAVEL (SM/GM)		552.0	Field analysis for PCBs
				20	1 in. Thin Clayey SILT Lens at 22.5 ft			
9	18	W	9				552.0	Field analysis for VOCs
10	20	W	20				480.0	
				25	Gray, Silty Fine SAND (SM)			
					Clayey SILT (ML)			
11	24	M	19		Gray, Silty CLAY, Trace Fine Gravel (CL-ML)	3.5	49.0	
						> 4.0		
					End of Boring at 28.0 ft			
				30	Abandoned Borehole with Bentonite Cement Grout. Topped at the Surface with Bentonite Chips.			

**MONTGOMERY  
WATSON**

**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Off-Site Containment Area  
 Location Griffith, Indiana

Boring No. **SB215**  
 Job No. 4077.0075  
 Sheet 1 of 2  
 Surface Elevation 647.9  
 Northing: 6126.2  
 Easting: 5615.5

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Black TOPSOIL			
1	18	M	4		Light Brown, Silty, Fine to Medium SAND (SM)		0.0	
2	20	M	7		Trace Coarse Sand and Some Clay from 4.5 to 5.0 ft Brown Organic Matter (Leaves at 4.0 ft)		0.0	
3	24	M	16	5	Trace to Some Clay at 6.4 ft Clayey SAND Seams at 8.0, 8.3, 8.5 and 8.8 ft		0.0	
4	24	M	15				0.0	
5	24	M	17	10	Light Brown, Silty, Fine to Coarse SAND (SM), Trace to Some Fine Gravel		0.0	
6	20	M	12		Light Brown, Silty, Fine to Medium SAND (SM), Grading to Fine to Coarse Sand with Fine to Coarse Gravel, Trace to Some Clay from 12.5 to 13.0 ft		0.0	
7	18	M/W	4	15			0.0	

**WATER LEVEL OBSERVATIONS**

While Drilling 15.0 ft. Upon Completion of Drilling    ft.  
 Time After Drilling     
 Depth to Water     
 Depth to Cave in   

**GENERAL NOTES**

Start 1/26/96 End 1/26/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. **SB215**

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 647.9

Northing: 6126.2

Easting: 5615.5

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
8	12	W	4				0.0	
					Gray, Silty, Fine to Coarse SAND (SM)			
9	24	W	10				780.0	Field analysis for VOCs and PCBs
					Gray, Silty, Fine to Medium SAND Grading to Silty, Fine to Coarse Sand with Some Fine Gravel (SM/GM)			
10	24	W	9				897.0	Field analysis for VOCs and PCBs
				20	Free Product, Sheen on Split Spoon			
					Black Staining Present			
11	18	W	19				520.0	
					Dark Gray, Fine to Coarse SAND (SP), Trace to Little Silt			
12	12	W	18				634.0	
					Trace to Some, Fine to Coarse Gravel (SP)			
13	18	W	19	25			85.0	
14	18	W/M	42				145.0	
15	18	M	46	30			5.0	
					Gray, Silty CLAY (CL-ML), Trace Fine to Coarse Sand			
					End of Boring at 31.0 ft			
					Abandoned Borehole with Bentonite Cement Grout. Topped Surface with Bentonite Chips.			

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. **SB216**

Surface Elevation **645.9**

Job No. **4077.0075**

Sheet **1** of **2**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Black, Silty, Clayey TOPSOIL			
1	18	M	3		Light Brown, Silty, Fine to Medium SAND (SM)		0.0	
2	18	M	7				0.0	
3	18	M	9				0.0	
4	20	M	6		Silty, Fine to Coarse SAND with Trace Fine Gravel (SM)		0.0	
5	18	M	3				415.0	
					Gray at 12.5 ft, Silty, Fine to Coarse SAND (SM)			
6	18	M	3		Gray, Silty, Fine to Coarse SAND (SM), Trace Fine to Medium Gravel		4120.0	Field analysis for VOCs and PCBs

**WATER LEVEL OBSERVATIONS**

While Drilling 12.5 ft. Upon Completion of Drilling    ft.  
 Time After Drilling     
 Depth to Water     
 Depth to Cave in   

**GENERAL NOTES**

Start 1/29/96 End 1/29/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. **SB216**

Surface Elevation **645.9**

Job No. **4077.0075**

Sheet **2** of **2**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	18	M/W	5				204.0	
8	18	W	8				205.0	
9	12	W	10				95.0	
10	18	W	24		Gray Silty, Fine to Medium SAND (SM)		5.0	
11	18	W/M	33			4.0	0.0	
					Gray, Silty CLAY (CL-ML)			
					End of Boring at 28.0 ft			
					Abandoned Borehole with Bentonite Cement Grout. Topped at the Surface with Bentonite Chips.			

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. SB220

Job No. 4077.0075

Sheet 1 of 2

Surface Elevation 635.4

Northing: 6496.9

Easting: 5175.7

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Grass Surface, Dark Brown TOPSOIL with Grass			
1	18	M	4				0.0	
					Brown Organic Rich, Silty Fine SAND (SM), Trace Clay			
2	18	W	12				0.0	
					Dark Gray, Silty, Fine to Medium SAND (SM)			
3	18	W	17		Trace Clay		63.0	
4	18	W	16		2 in. Silt Seam at 10.0 ft Some Black Discoloration from 9.0 to 10.5 ft		263.0	Field analysis for VOCs and PCBs
5	18	W	21		Light Gray, Silty Fine to Medium SAND (SM) 2 in. Dark Gray, Silty CLAY/Clayey SILT Seam at 11.5 ft 1 in. Clayey SILT at 12.5 ft		1862.0	Field analysis for VOCs and PCBs
6	18	W	20		1 in. SILT Lens from 14.0 to 14.5 ft		10.0	

**WATER LEVEL OBSERVATIONS**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling     
 Depth to Water     
 Depth to Cave in   

**GENERAL NOTES**

Start 1/30/96 End 1/30/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

J4077G1on40770 ID: CHICAGO

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. SB220

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 635.4

Northing: 6496.9

Easting: 5175.7

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	24	W	20		Gray Silty CLAY (CL-ML)	3.5	0.0	
						>4.0		
					End of Boring at 18.0 ft			
				20	Abandoned Borehole with Bentonite Cement Grout. Topped at the Surface with Bentonite Chips.			
				25				
				30				

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

Boring No. **SB221**

Job No. 4077.0075

Sheet 1 of 2

Surface Elevation 634.0

Northing: 6353.9

Easting: 5138.1

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Black/Dark Brown, Clayey TOPSOIL			
1	18	W	10		Dark Gray, Silty, Fine to Medium SAND (SM)		0.0	
2	18	W	12		Dense, Clayey, Silty, Fine to Coarse SAND (SM)		0.0	
					Dark Gray, Silty Fine SAND (SM)			
3	18	W	12	5			45.0	
4	18	W	30				514.0	
5	18	W	32	10			3105.0	Field analysis for VOCs and PCBs
6	18	W	43				1338.0	Field analysis for VOCs and PCBs
					3 in. CLAY Lens at 12 ft over 1 in. SAND Lens			
					2 in. CLAY Seam at 12.3 ft			
7	24	M	43		Gray, Silty CLAY (CL-ML)	> 4.0	1264.0	
				15				

**WATER LEVEL OBSERVATIONS**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling     
 Depth to Water     
 Depth to Cave in   

**GENERAL NOTES**

Start 1/31/96 End 1/31/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.

Off-Site Containment Area

Location Griffith, Indiana

Boring No. SB221

Job No. 4077.0075

Sheet 2 of 2

Surface Elevation 634.0

Northing: 6353.9

Easting: 5138.1

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					End of Boring at 15.0 ft			
					Abandoned Borehole with Bentonite Cement Grout. Topped at the Surface with Bentonite Chips.			
				20				
				25				
				30				

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Off-Site Containment Area  
 Location Griffith, Indiana

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

Boring No. **SB222**  
 Job No. **4077.0075**  
 Sheet **1 of 2**  
 Surface Elevation **638.6**  
 Northing: **6223.4**  
 Easting: **5069.4**

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Dark Brown, Silty Clayey TOPSOIL			
1	6	M	8		FILL: Black, Wood and Clayey, Poor Recovery		0.0	
2	8	M	15				0.0	
				5	Black, Silty, Fine to Medium SAND (SM), Trace Coarse Gravel			
3	8	W	20		Gray, Silty, Fine to Medium SAND (SM)		0.0	
4	18	W	14		Color Changing Dark Gray to Gray		15.0	
				10				
5	12	W	27		Dark Gray, Silty, Fine to Medium SAND (SM)		81.0	
6	12	W	24				3015.0	Field analysis for VOCs and PCBs
				15				

**WATER LEVEL OBSERVATIONS**

While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling     
 Depth to Water     
 Depth to Cave in   

**GENERAL NOTES**

Start 1/31/96 End 1/31/96  
 Driller E & F Chief JE Rig CME  
 Logger PMS Editor DAP 850  
 Drill Method 3 1/4" I.D. HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Off-Site Containment Area  
 Location Griffith, Indiana

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

Boring No. **SB222**  
 Job No. 4077.0075  
 Sheet 2 of 2  
 Surface Elevation 638.6  
 Northing: 6223.4  
 Easting: 5069.4

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	18	W	22		Gray, Clayey SILT (ML) 1 in. Sand Seam at 17.5 ft		154.0	
8	20	M	19		Gray, Silty CLAY (CL-ML)	3.5	45.0	
				20		> 4.0		
					End of Boring at 20.5 ft  Abandoned Borehole with Bentonite Cement Grout. Topped at the Surface with Bentonite Chips.			
				25				
				30				

**MONTGOMERY  
WATSON**

**LOG OF TEST BORING**

 Project American Chemical Service, Inc.
Off-Site Containment Area

 Location Griffith, Indiana

 Boring No. **SB223**

 Surface Elevation **638.5**

 Job No. **4077.0075**

 Sheet **1** of **2**

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
					Gray Slag, Gravel, Black Sand and Gravel (FILL)			
1	14	M	5		Yellow Brown Fine SAND (SP), Trace Roots, Trace Fine Gravel	--	0.0	
2	16	M	4		Dark Yellow Brown to Brown, Fine SAND (SP), Little Silt and Clay, Musty Propane-Like Odor Present	--	6.0	
3	16	W	5		Light Olive Brown Fine SAND (SP), Musty Odor	--	6.0	
4	14	W	8		Gray to Olive Gray Brown Fine SAND (SP), Little Silt, Trace Medium to Coarse Sand and Gravel	--	3.0	
5	14	W	9		Gray Fine SAND (SP), Trace Organics, Roots	--	33.0	
6	14	W	9		Gray to Gray Brown Fine SAND (SP), Little Silt, Trace Medium to Coarse Sand and Fine Gravel, Sweet Propane Like Odor	--	6.0	

**WATER LEVEL OBSERVATIONS**

 While Drilling    ft. Upon Completion of Drilling    ft.  
 Time After Drilling         
 Depth to Water         
 Depth to Cave in       

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**GENERAL NOTES**

 Start 2/12/96 End 2/12/96  
 Driller E & F Chief GH Rig CME 55  
 Logger DAP Editor PMS  
 Drill Method 4 1/4" I.D. HSA



**MONTGOMERY  
WATSON**



**LOG OF TEST BORING**

Project American Chemical Service, Inc.  
Off-Site Containment Area  
 Location Griffith, Indiana

Boring No. SB223  
 Surface Elevation 638.5  
 Job No. 4077.0075  
 Sheet 2 of 2

2100 Corporate Drive, Addison, Illinois 60101, TEL. (708) 691-5000

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES		
No.	Rec. (in.)	Mois- ture	N Value	Depth (ft.)		qu (qa) (tsf)	PID (ppm)	Remarks
7	18	W	13		Gray Brown Fine SAND (SP), Sweet Propane Like Odor, Silt and Clay Lense from 17 to 17.2 ft	--	3.0	
8	18	W/M	8		Grades into Gray, Fine to Coarse SAND (SP) at 19.5 to 20.0 ft	3.5-4.0	51.0	Field Analysis for VOCs and PCBs
9	12	M			Very Stiff, Gray Silty CLAY (CL-ML)	4.0		
					End of Boring at 22.5 ft			
					Abandoned Borehole with Bentonite Cement Grout. Topped at the Surface with Bentonite Chips.			

E

IEA ANALYTICAL LABORATORY RESULTS

**IEA, Inc**  
**IEA Project NO.: 1589\_126D**  
**SDG: 01511**  
**Client Project ID: 4077.0075**  
**Data Summary Package**

IEA

## SDG NARRATIVE VOLATILE FRACTION

PROJECT: 1589-126

BATCH: 01511

METHOD: 1/91 SOW

SAMPLES: Three (3) Soil Samples

These samples were received at Industrial and Environmental Analysts, Inc. (IEA) on January 25 and February 01, 1996. Each sample was assigned a 9-character "IEA" lab identification number (lab ID) and an abbreviated client ID for simplicity in forms generation. This package makes reference to these ID's as listed on the IEA Assigned Number Index. In addition the pH for the water samples are listed on this index. All analyses were performed according to the EPA 1/91 SOW and meet the requirements of the IEA Quality Assurance Program. Please see the enclosed data package for your results and Chain of Custody (COC) documentation.

There is an air peak that is common to all of the volatile analyses and a solvent peak that is common to some volatile analyses. These peaks are present at the beginning of the Reconstructed Ion Chromatograms (RIC) and are labeled. These peaks are not searched as Tentatively Identified Compounds (TIC's).

The chromatographic separation of the analytes is performed using a J & W Scientific 75 m X 0.53 mm DB-624 fused silica capillary column with a 3.0  $\mu$ m film thickness.

The trap used in the purge-and-trap apparatus is a Supelco trap K (VOCARB 3000) consisting of 10 cm of Carboxen B, 6 cm of Carboxen 1000, and 1 cm of Carboxen 1001. This trap meets the criteria in the EPA 1/91 SOW for an equivalent trap. Documentation is maintained within the QA department for on-site review.

The "J" flag used on the Form I VOA indicates an estimated concentration between the Contract Required Quantitation Limit (CRQL) and the Method Detection Limit (MDL), not accounting for dilution of the sample prior to analysis. This flag is also used on the Form I VOA-TIC to indicate an estimated amount for all non-target concentrations.

The "N" flag used on the Form I VOA-TIC indicates that there is the presumptive evidence of a compound based on the mass spectral library search and the interpretation of the mass spectral interpretation specialist.

The "Y" flag is used as a qualifier on the Form I VOA-TIC to indicate a siloxane contaminant attributed to trap breakdown.

The "M" flag used on the data system report form designates that a manual integration was required to provide an accurate quantification of that analyte. Manual integrations have been initialled and dated by the analyst.

The "D" flag is used on the surrogate and spike recoveries to designate they were diluted out.

IEA

SDG NARRATIVE VOLATILE FRACTION

The "M" flag used on the data system report form designates that a manual integration was required to provide an accurate quantification of that analyte. Manual integrations have been initialled and dated by the analyst.

The following nonconformances associated with the analysis of the samples in this case are as follows:

Sample number 04 (client ID ACS-SB118SS3-6'-8") was used for the medium level soil matrix spike and matrix spike duplicate (MS/MSD). Due to the high dilution factor most of the spike compounds did not recover. This is designated with the "D" flag on the percent recoveries.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his designee, as verified by the following signature.



08/21/96

Brian D. Neptune  
Lead Analyst, GC/MS Final Review  
IEA, Inc.

CASE: 1589-126

SDG NO.:01511

CONTRACT: SOW 1/91

Samples: (8) Soil Samples

This case was closed on February 1, 1996. Each sample has been assigned a 9-character IEA lab identification number.

The chromatographic separation of the analytes was performed using a J & W 30 m X 0.53 mm DB-1701 fused silica capillary column with a 1.0  $\mu$ m bonded phase film thickness and a Restek 30 m X 0.53 mm Rt<sub>x</sub>-35 fused silica capillary column with a 1.0  $\mu$ m bonded phase film thickness. The Rt<sub>x</sub>-35 column used as one of the analytical columns is equivalent to the DB-608 column specified in the SOW.

The filenames have an extension of ".D" to denote the use of the ASCII file generated by the data system to produce the forms. Two significant figures were reported for the "calculated amount" on Form VII PEST-1 and -2. All of the initial pesticide chromatograms were missing the scaling factor; however, the scaling factor (in mV scale) appeared for the re-plotted chromatograms.

Gel Permeation Cleanup (GPC) was performed using a column series: a 19 X 300 mm Waters UltraStyragel column paired with a 19 X 150 mm Waters UltraStyragel column. The additional column provides the additional resolution needed to achieve the criteria for pesticide analysis. This column combination meets the equivalency criteria in paragraph 10.1.8.1.2, page D-43/PEST. A 2 mL injection loop is utilized by the GPC system.

All soil sample extracts underwent GPC as required by the SOW. Florisil column cleanup was performed on all sample extracts as required by the SOW.

The "P" flag is used to designate that there is a greater than 25% difference in the detected concentration of an analyte between the two analytical columns.

The "J" flag is used to designate target compounds reported below the quantitation limits.

The "\*" used on the Form III PEST designates percent recoveries and/or RPD's are outside the QC limits.

The "D" flag indicates a target compound that is reported in the more dilute analysis.

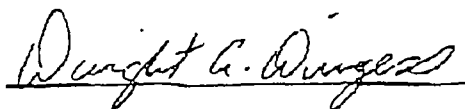
Any nonconformances associated with the analysis of the samples in this case are note as follows:

The Matrix Spike/Matrix Spike Duplicate had zero (0) percent recovery due to sample dilution.

The aroclor 1254 present in the samples had high percent differences on the RTX-35 column due to overlapping of the aroclor 1248 pattern.

All samples were analyzed at dilutions due to target compounds that exceeded the calibration range. The surrogate recoveries were below the advisory limits due to dilutions and sample matrix interference.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his designee, as verified by the following signature.

 03/07/96

Dwight A. Dingess  
GC SV Lead Analyst  
IEA, Inc.



**MONTGOMERY WATSON**

## CHAIN OF CUSTODY RECORD

**SPECIAL INSTRUCTIONS:**

AROUND

- ☐ PECFA  
☐ WILUST  
☐ ACT 307  
☐ REPORT DRY WT  
☐ OTHER:



- ☐ 2 WEEKS (standard)  
☐ 1 WEEK  
☐ 3 DAYS  
☐ 1 DAY

[illegible]

## LA DQO Level 3 Analysis

FOEX # 3609255020  
COC SEAL #S 92 00078  
92 octu 79

PROJ. MGR.: Pete Vast  
708-691-5020

SIGNATURE	PRINT NAME	COMPANY / TITLE	DATE	TIME
RELINQUISHED BY: 	DAVID A. Piczynga	Montgomery Watson / Hydrogeologist	1-24-96	1800
RECEIVED BY: 	B. H. Springer	IEI	1/25/96	0940
RELINQUISHED BY:				
RECEIVED BY:				

C-O-C No. 101 70

1589-126D

NAME OF COURIER: \_\_\_\_\_

AIRBILL NUMBER: \_\_\_\_\_





MONTGOMERY WATSON

## CHAIN OF CUSTODY RECORD

SPECIAL  
INSTRUCTIONS:

- ☐ PECFA  
☐ WL LUST  
☐ ACT 307  
☐ REPORT DRY WT  
☐ OTHER:

JAROUND

- ☐ 2 WEEKS (standard)  
☐ 1 WEEK  
☐ 3 DAYS  
☐ 1 DAY

PROJECT NAME: <b>ACS</b>			PROJECT #: <b>4077.0075</b>			
CITY: <b>Griffith, Indiana</b>			STATE:			
SAMPLER(S): <i>David P. ...</i>						
COLLECTION DATE	COLLECTION TIME	GRAB / COMP	SAMPLE ID	NO. OF CONTAINERS	REMARKS	LAB USE ONLY
						MATRIX
						LAB NO.
1-24-96	1600	Grab	ACS-SB118SS3-6'-8'		9-30137	
1-25-96	0915		ACS-SB119SS3-6'-8'		9-30138	
1-26-96	1035		ACS-SB124SS4-8.5'-10.5'		9-30139	
1-30-96	0900		ACS-SB127SS3-6'-8'		9-30140	
1-30-96	1100		ACS-SB128SS3-6'-8'		9-30141	
1-30-96	1430		ACS-SB129SS5-11'-13'		9-30142	
1-26-96	0900		ACS-SB214SS6 13.5'-15.5'		9-30143	
1-30-96	1100	Grab	ACS-SB128SS3-6'-8' DUP		9-30144 Duplicate	
1-30-96	1430	Grab	ACS-SB129SS5-11'-13' ms/msd		9-30145 ms/msd	
SPECIAL INSTRUCTIONS: <b>COC Seal #s: 92-00080, 81</b>			RECEIVED: <input type="checkbox"/> INTACT <input type="checkbox"/> ON ICE TEMP _____ OF			PROJ. MGR: <b>Pete Vast</b>

CLP TCL VOCs  
CLP TCL PCBs

\* NOTE: Hold off on PCB Analysis until,  
Pete Vast or Dave Pieczynski calls to confirm.

5°C

SIGNATURE	PRINT NAME	COMPANY / TITLE	DATE	TIME
RELINQUISHED BY: <i>David P. ...</i>	DAVID PIECZYNSKI	Montgomery Watson / Hydrogeologist	1/31/96	1730
RECEIVED BY: <i>D. McCormick</i>	D. MCCORMICK	IEA / Sample Mngt	2/1/96	09:45
RELINQUISHED BY:				
RECEIVED BY:				

C-O-C No. 01071

1589-1261

NAME OF COURIER: **Fedex**  
AIRBILL NUMBER: **3609254994**

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACS-SB110SS4-7'-9'

Lab Name: IEA-NC

Method: SOW 1/91

Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960151101

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0130E07.D

Level: (low/med) MED

Date Received: 01/25/96

% Moisture: not dec. 15

Date Analyzed: 01/30/96

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 400.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) ug/kg Q

74-87-3	Chloromethane	560000	U
74-83-9	Bromomethane	560000	U
75-01-4	Vinyl Chloride	560000	U
75-00-3	Chloroethane	560000	U
75-09-2	Methylene Chloride	560000	U
7-64-1	Acetone	560000	U
5-15-0	Carbon Disulfide	560000	U
75-35-4	1,1-Dichloroethene	560000	U
75-34-3	1,1-Dichloroethane	560000	U
540-59-0	1,2-Dichloroethene (total)	240000	J
67-66-3	Chloroform	560000	U
107-06-2	1,2-Dichloroethane	560000	U
78-93-3	2-Butanone	560000	U
71-55-6	1,1,1-Trichloroethane	2200000	
56-23-5	Carbon Tetrachloride	560000	U
75-27-4	Bromodichloromethane	560000	U
78-87-5	1,2-Dichloropropane	560000	U
10061-01-5	cis-1,3-Dichloropropene	560000	U
79-01-6	Trichloroethene	2800000	
124-48-1	Dibromochloromethane	560000	U
79-00-5	1,1,2-Trichloroethane	560000	U
71-43-2	Benzene	150000	J
10061-02-6	Trans-1,3-Dichloropropene	560000	U
75-25-2	Bromoform	560000	U
108-10-1	4-Methyl-2-Pentanone	560000	U
591-78-6	2-Hexanone	560000	U
127-18-4	Tetrachloroethene	8300000	
108-88-3	Toluene	2600000	
79-34-5	1,1,2,2-Tetrachloroethane	560000	U
108-90-7	Chlorobenzene	560000	U
100-41-4	Ethylbenzene	930000	
100-42-5	Styrene	560000	U
1330-20-7	Xylene (total)	4600000	

CLIENT SAMPLE NO.

ACS-SB110SS4-7'-9'

Method: SOW 1/91

SDG No.: 01511

Lab Sample ID: 960151101

Lab File ID: 0130E07.D

Date Received: 01/25/96

Date Analyzed: 01/30/96

Dilution Factor: 400.0

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/kg

[illegible]

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACS-SB118SS3-6'-8'

Lab Name: IEA-NC

Method: SOW 1/91

Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212404

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0210E07.D

Level: (low/med) MED

Date Received: 02/01/96

% Moisture: not dec. 13

Date Analyzed: 02/10/96

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 200.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) ug/kg Q

74-87-3	Chloromethane	280000	U
74-83-9	Bromomethane	280000	U
75-01-4	Vinyl Chloride	280000	U
75-00-3	Chloroethane	280000	U
75-09-2	Methylene Chloride	280000	U
67-64-1	Acetone	230000	J
5-15-0	Carbon Disulfide	280000	U
75-35-4	1,1-Dichloroethene	280000	U
75-34-3	1,1-Dichloroethane	280000	U
540-59-0	1,2-Dichloroethene (total)	280000	U
67-66-3	Chloroform	280000	U
107-06-2	1,2-Dichloroethane	280000	U
78-93-3	2-Butanone	280000	U
71-55-6	1,1,1-Trichloroethane	280000	U
56-23-5	Carbon Tetrachloride	280000	U
75-27-4	Bromodichloromethane	280000	U
78-87-5	1,2-Dichloropropane	280000	U
10061-01-5	cis-1,3-Dichloropropene	280000	U
79-01-6	Trichloroethene	80000	J
124-48-1	Dibromochloromethane	280000	U
79-00-5	1,1,2-Trichloroethane	280000	U
71-43-2	Benzene	280000	U
10061-02-6	Trans-1,3-Dichloropropene	280000	U
75-25-2	Bromoform	280000	U
108-10-1	4-Methyl-2-Pentanone	280000	U
591-78-6	2-Hexanone	280000	U
127-18-4	Tetrachloroethene	360000	
108-88-3	Toluene	3800000	
79-34-5	1,1,2,2-Tetrachloroethane	280000	U
108-90-7	Chlorobenzene	280000	U
100-41-4	Ethylbenzene	1000000	
100-42-5	Styrene	280000	U
1330-20-7	Xylene (total)	4500000	

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACS-SB118SS3-6'-8'

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212404

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0210E07.D

Level: (low/med) MED

Date Received: 02/01/96

% Moisture: not dec. 13

Date Analyzed: 02/10/96

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 200.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) ug/kg Q

74-87-3	Chloromethane	280000	U
74-83-9	Bromomethane	280000	U
75-01-4	Vinyl Chloride	280000	U
75-00-3	Chloroethane	280000	U
75-09-2	Methylene Chloride	280000	U
67-64-1	Acetone	130000	J
75-15-0	Carbon Disulfide	280000	U
75-35-4	1,1-Dichloroethene	280000	U
75-34-3	1,1-Dichloroethane	280000	U
540-59-0	1,2-Dichloroethene (total)	280000	U
67-66-3	Chloroform	280000	U
107-06-2	1,2-Dichloroethane	280000	U
78-93-3	2-Butanone	53000	J
71-55-6	1,1,1-Trichloroethane	38000	J
56-23-5	Carbon Tetrachloride	280000	U
75-27-4	Bromodichloromethane	280000	U
78-87-5	1,2-Dichloropropane	280000	U
10061-01-5	cis-1,3-Dichloropropene	280000	U
79-01-6	Trichloroethene	80000	J
124-48-1	Dibromochloromethane	280000	U
79-00-5	1,1,2-Trichloroethane	43000	J
71-43-2	Benzene	280000	U
10061-02-6	Trans-1,3-Dichloropropene	280000	U
75-25-2	Bromoform	280000	U
108-10-1	4-Methyl-2-Pentanone	280000	U
591-78-6	2-Hexanone	90000	J
127-18-4	Tetrachloroethene	360000	
108-88-3	Toluene	3800000	
79-34-5	1,1,2,2-Tetrachloroethane	280000	U
108-90-7	Chlorobenzene	280000	U
100-41-4	Ethylbenzene	1000000	
100-42-5	Styrene	34000	J
1330-20-7	Xylene (total)	4500000	

CLIENT SAMPLE NO.

Lab Name: IEA-NC

Method: SOW 1/91

Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212404

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0210E07.D

Level: (low/med) MED

Date Received: 02/01/96

% Moisture: not dec. 13

Date Analyzed: 02/10/96

GC Column: DB-624 ID: .53 (mm)

Dilution Factor: 200.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

Number TICs Found: 11

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/kg

[illegible]

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACS-SB119SS3-6'-8'

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212405

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0210E12.D

Level: (low/med) MED

Date Received: 02/01/96

% Moisture: not dec. 12

Date Analyzed: 02/11/96

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 100.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/kg Q

74-87-3	Chloromethane	140000	U
74-83-9	Bromomethane	140000	U
75-01-4	Vinyl Chloride	140000	U
75-00-3	Chloroethane	140000	U
75-09-2	Methylene Chloride	140000	U
7-64-1	Acetone	140000	U
75-15-0	Carbon Disulfide	140000	U
75-35-4	1,1-Dichloroethene	140000	U
75-34-3	1,1-Dichloroethane	140000	U
540-59-0	1,2-Dichloroethene (total)	47000	J
67-66-3	Chloroform	140000	U
107-06-2	1,2-Dichloroethane	140000	U
78-93-3	2-Butanone	140000	U
71-55-6	1,1,1-Trichloroethane	140000	U
56-23-5	Carbon Tetrachloride	140000	U
75-27-4	Bromodichloromethane	140000	U
78-87-5	1,2-Dichloropropane	140000	U
10061-01-5	cis-1,3-Dichloropropene	140000	U
79-01-6	Trichloroethene	140000	U
124-48-1	Dibromochloromethane	140000	U
79-00-5	1,1,2-Trichloroethane	140000	U
71-43-2	Benzene	41000	J
10061-02-6	Trans-1,3-Dichloropropene	140000	U
75-25-2	Bromoform	140000	U
108-10-1	4-Methyl-2-Pentanone	140000	U
591-78-6	2-Hexanone	140000	U
127-18-4	Tetrachloroethene	50000	J
108-88-3	Toluene	1600000	
79-34-5	1,1,2,2-Tetrachloroethane	140000	U
108-90-7	Chlorobenzene	140000	U
100-41-4	Ethylbenzene	590000	
100-42-5	Styrene	140000	U
1330-20-7	Xylene (total)	3000000	

CLIENT SAMPLE NO.

ACS-SB119SS3-6'-8'

Method: SOW 1/91

SDG No.: 01511

Lab Sample ID: 960212405

Lab File ID: 0210E12.D

Date Received: 02/01/96

Date Analyzed: 02/11/96

Dilution Factor: 100.0

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/kg

[illegible]



1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VBLK54

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: VBLK54

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0210E02.D

Level: (low/med) MED

Date Received:

% Moisture: not dec. 0

Date Analyzed: 02/10/96

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 1.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) ug/kg Q

74-87-3	Chloromethane	1200	U
74-83-9	Bromomethane	1200	U
75-01-4	Vinyl Chloride	1200	U
75-00-3	Chloroethane	1200	U
75-09-2	Methylene Chloride	1200	U
7-64-1	Acetone	1200	U
5-15-0	Carbon Disulfide	1200	U
75-35-4	1,1-Dichloroethene	1200	U
75-34-3	1,1-Dichloroethane	1200	U
540-59-0	1,2-Dichloroethene (total)	1200	U
67-66-3	Chloroform	1200	U
107-06-2	1,2-Dichloroethane	1200	U
78-93-3	2-Butanone	1200	U
71-55-6	1,1,1-Trichloroethane	1200	U
56-23-5	Carbon Tetrachloride	1200	U
75-27-4	Bromodichloromethane	1200	U
78-87-5	1,2-Dichloropropane	1200	U
10061-01-5	cis-1,3-Dichloropropene	1200	U
79-01-6	Trichloroethene	1200	U
124-48-1	Dibromochloromethane	1200	U
79-00-5	1,1,2-Trichloroethane	1200	U
71-43-2	Benzene	1200	U
10061-02-6	Trans-1,3-Dichloropropene	1200	U
75-25-2	Bromoform	1200	U
108-10-1	4-Methyl-2-Pentanone	1200	U
591-78-6	2-Hexanone	1200	U
127-18-4	Tetrachloroethene	1200	U
108-88-3	Toluene	1200	U
79-34-5	1,1,2,2-Tetrachloroethane	1200	U
108-90-7	Chlorobenzene	1200	U
100-41-4	Ethylbenzene	1200	U
100-42-5	Styrene	1200	U
1330-20-7	Xylene (total)	1200	U

CLIENT SAMPLE NO.

VBLK54

Method: SOW 1/91

SDG No.: 01511

Lab Sample ID: VBLK54

Lab File ID: 0210E02.D

Date Received:

Date Analyzed: 02/10/96

Dilution Factor: 1.0

Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/kg

[illegible]

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VBLK5M

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: VBLK5M

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0130E03.D

Level: (low/med) MED

Date Received:

% Moisture: not dec. 0

Date Analyzed: 01/30/96

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 1.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) ug/kg Q

74-87-3	Chloromethane	1200	U
74-83-9	Bromomethane	1200	U
75-01-4	Vinyl Chloride	1200	U
75-00-3	Chloroethane	1200	U
75-09-2	Methylene Chloride	1200	U
7-64-1	Acetone	1200	U
75-15-0	Carbon Disulfide	1200	U
75-35-4	1,1-Dichloroethene	1200	U
75-34-3	1,1-Dichloroethane	1200	U
540-59-0	1,2-Dichloroethene (total)	1200	U
67-66-3	Chloroform	1200	U
107-06-2	1,2-Dichloroethane	1200	U
78-93-3	2-Butanone	1200	U
71-55-6	1,1,1-Trichloroethane	1200	U
56-23-5	Carbon Tetrachloride	1200	U
75-27-4	Bromodichloromethane	1200	U
78-87-5	1,2-Dichloropropane	1200	U
10061-01-5	cis-1,3-Dichloropropene	1200	U
79-01-6	Trichloroethene	1200	U
124-48-1	Dibromochloromethane	1200	U
79-00-5	1,1,2-Trichloroethane	1200	U
71-43-2	Benzene	1200	U
10061-02-6	Trans-1,3-Dichloropropene	1200	U
75-25-2	Bromoform	1200	U
108-10-1	4-Methyl-2-Pentanone	1200	U
591-78-6	2-Hexanone	1200	U
127-18-4	Tetrachloroethene	1200	U
108-88-3	Toluene	1200	U
79-34-5	1,1,2,2-Tetrachloroethane	1200	U
108-90-7	Chlorobenzene	1200	U
100-41-4	Ethylbenzene	1200	U
100-42-5	Styrene	1200	U
1330-20-7	Xylene (total)	1200	U

CLIENT SAMPLE NO.

Method: SOW 1/91

VBLK5M

SDG No.: 01511

Lab Sample ID: VBLK5M

Lab File ID: 0130E03.D

Date Received:

Date Analyzed: 01/30/96

Dilution Factor: 1.0

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/kg

[illegible]

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACS-SB118SS3-6'-8'MS

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212404MS

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0210E09.D

Level: (low/med) MED

Date Received: 02/01/96

% Moisture: not dec. 13

Date Analyzed: 02/10/96

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 200.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) ug/kg Q

74-87-3	Chloromethane	280000	U
74-83-9	Bromomethane	280000	U
75-01-4	Vinyl Chloride	280000	U
75-00-3	Chloroethane	280000	U
75-09-2	Methylene Chloride	280000	U
67-64-1	Acetone	280000	U
75-15-0	Carbon Disulfide	280000	U
75-35-4	1,1-Dichloroethene	280000	U
75-34-3	1,1-Dichloroethane	280000	U
540-59-0	1,2-Dichloroethene (total)	280000	U
67-66-3	Chloroform	280000	U
107-06-2	1,2-Dichloroethane	280000	U
78-93-3	2-Butanone	280000	U
71-55-6	1,1,1-Trichloroethane	280000	U
56-23-5	Carbon Tetrachloride	280000	U
75-27-4	Bromodichloromethane	280000	U
78-87-5	1,2-Dichloropropane	280000	U
10061-01-5	cis-1,3-Dichloropropene	280000	U
79-01-6	Trichloroethene	90000	J
124-48-1	Dibromochloromethane	280000	U
79-00-5	1,1,2-Trichloroethane	280000	U
71-43-2	Benzene	280000	U
10061-02-6	Trans-1,3-Dichloropropene	280000	U
75-25-2	Bromoform	280000	U
108-10-1	4-Methyl-2-Pentanone	280000	U
591-78-6	2-Hexanone	280000	U
127-18-4	Tetrachloroethene	390000	
108-88-3	Toluene	4100000	
79-34-5	1,1,2,2-Tetrachloroethane	280000	U
108-90-7	Chlorobenzene	280000	U
100-41-4	Ethylbenzene	1100000	
100-42-5	Styrene	280000	U
1330-20-7	Xylene (total)	5000000	

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACS-SB118SS3-6'-8'MSD

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212404MSD

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0210E10.D

Level: (low/med) MED

Date Received: 02/01/96

% Moisture: not dec. 13

Date Analyzed: 02/10/96

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 200.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) ug/kg Q

74-87-3	Chloromethane	280000	U
74-83-9	Bromomethane	280000	U
75-01-4	Vinyl Chloride	280000	U
75-00-3	Chloroethane	280000	U
75-09-2	Methylene Chloride	280000	U
75-64-1	Acetone	280000	U
75-15-0	Carbon Disulfide	280000	U
75-35-4	1,1-Dichloroethene	280000	U
75-34-3	1,1-Dichloroethane	280000	U
540-59-0	1,2-Dichloroethene (total)	280000	U
67-66-3	Chloroform	280000	U
107-06-2	1,2-Dichloroethane	280000	U
78-93-3	2-Butanone	280000	U
71-55-6	1,1,1-Trichloroethane	280000	U
56-23-5	Carbon Tetrachloride	280000	U
75-27-4	Bromodichloromethane	280000	U
78-87-5	1,2-Dichloropropane	280000	U
10061-01-5	cis-1,3-Dichloropropene	280000	U
79-01-6	Trichloroethene	90000	J
124-48-1	Dibromochloromethane	280000	U
79-00-5	1,1,2-Trichloroethane	280000	U
71-43-2	Benzene	280000	U
10061-02-6	Trans-1,3-Dichloropropene	280000	U
75-25-2	Bromoform	280000	U
108-10-1	4-Methyl-2-Pentanone	280000	U
591-78-6	2-Hexanone	280000	U
127-18-4	Tetrachloroethene	370000	
108-88-3	Toluene	4000000	
79-34-5	1,1,2,2-Tetrachloroethane	280000	U
108-90-7	Chlorobenzene	280000	U
100-41-4	Ethylbenzene	1100000	
100-42-5	Styrene	280000	U
1330-20-7	Xylene (total)	4800000	

2B  
SOIL VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-126

SDG No.: 01511

Level: (low/med) MED

	CLIENT SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 (DCE) #	OTHER	TOT OUT
01	VBLK5M	99	97	96		0
02	ACS-SB110SS4-7'-9'	96D	97D	96D		0
03	VBLK54	101	97	93		0
04	ACS-SB118SS3-6'-8'	100D	98D	96D		0
05	ACS-SB118SS3-6'-8'MS	101D	98D	96D		0
06	ACS-SB118SS3-6'-8'MSD	101D	97D	96D		0
07	ACS-SB119SS3-6'-8'	101D	100D	95D		0
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

QC LIMITS

SMC1 (TOL) = Toluene-d8 (84-138)  
 SMC2 (BFB) = Bromofluorobenzene (59-113)  
 SMC3 (DCE) = 1,2-Dichloroethane-d4 (70-121)

# Column to be used to flag recovery values

\* Values outside of QC limits.

D System Monitoring Compound diluted out

3B  
SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix Spike - Client Sample No.: ACS-SB118SS3-6'-8' Level: (low/med) MED

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC. LIMITS REC.
1,1-Dichloroethene	7200	0	0	0 D	59-172
Trichloroethene	7200	80000	90000	139 D	62-137
Benzene	7200	0	0	0 D	66-142
Toluene	7200	3800000	4100000	4167 D	59-139
Chlorobenzene	7200	0	0	0 D	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS	
					RPD	REC.
1,1-Dichloroethene	7200	0	0 D	0	22	59-172
Trichloroethene	7200	90000	139 D	0	24	62-137
Benzene	7200	0	0 D	0	21	66-142
Toluene	7200	4000000	2778 D	40*	21	59-139
Chlorobenzene	7200	0	0 D	0	21	60-133

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits.

D Spike compound diluted out.

RPD: 1 out of 5 outside limits

Spike Recovery: 10 out of 10 outside limits

COMMENTS:



CLIENT SAMPLE NO.

o Name: IEA-NC

Lab Code: IEA

SDG No.: 01511

Lab File ID: 0210E02.D

Lab Sample ID: VBLK54

Date Analyzed: 02/10/96

Time Analyzed: 16:13

GC Column: DB-624 ID: .53 (mm)

Heated Purge: (Y/N) N

Instrument ID: MSD5

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

COMMENTS: \_\_\_\_\_

4A  
VOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE NO.

VBK5M

o Name: IEA-NC Method: SOW 1/91  
Lab Code: IEA Case No.: 1589-126 SDG No.: 01511  
Lab File ID: 0130E03.D Lab Sample ID: VBK5M  
Date Analyzed: 01/30/96 Time Analyzed: 19:17  
GC Column: DB-624 ID: .53(mm) Heated Purge: (Y/N) N  
Instrument ID: MSD5

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	ACS-SB110SS4-7'-9'	960151101	0130E07.D	22:26
02				
03				
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS:

8A  
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: IEA-NC

Method: SOW 1/91

Code: IEA

Case No.: 1589-126

SDG No.: 01511

Lab File ID (Standard): 0210E01.D

Date Analyzed: 02/10/96

Instrument ID: MSD5

Time Analyzed: 15:15

GC Column: DB-624

ID: .53(mm)

Heated Purge: (Y/N) N

	IS1(BCM) AREA #	RT #	IS2(DFB) AREA #	RT #	IS3(CBZ) AREA #	RT #
12 HOUR STD	1920768	10.28	7337000	12.47	6129399	18.76
UPPER LIMIT	3841536	10.78	14674000	12.97	12258798	19.26
LOWER LIMIT	960384	9.78	3668500	11.97	3064700	18.26
EPA SAMPLE NO.						
01 VBLK54	2092039	10.26	8294178	12.45	7048406	18.76
02 ACS-SB118SS3-6'-8'	1874453	10.26	7269201	12.45	6280866	18.75
03 ACS-SB118SS3-6'-8'MS	1877308	10.28	7200384	12.46	6075167	18.76
04 ACS-SB118SS3-6'-8'MSD	1900638	10.24	7418966	12.43	6346631	18.74
05 ACS-SB119SS3-6'-8'	2006674	10.26	7889737	12.45	6719501	18.75
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (BCM) = Bromochloromethane

IS2 (DFB) = 1,4-Difluorobenzene

IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area

AREA LOWER LIMIT = - 50% of internal standard area

RT UPPER LIMIT = +0.50 minutes of internal standard RT

RT LOWER LIMIT = -0.50 minutes of internal standard RT

# Column used to flag values outside QC limits with an asterisk.

\* Values outside of QC limits.

8A  
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: IEA-NC

Method: SOW 1/91

o Code: IEA

Case No.: 1589-126

SDG No.: 01511

Lab File ID (Standard): 0130E01S.D

Date Analyzed: 01/30/96

Instrument ID: MSD5

Time Analyzed: 17:27

GC Column: DB-624

ID: .53 (mm)

Heated Purge: (Y/N) N

	IS1 (BCM) AREA #	RT #	IS2 (DFB) AREA #	RT #	IS3 (CBZ) AREA #	RT #
12 HOUR STD	1314981	10.32	4794436	12.49	4007378	18.75
UPPER LIMIT	2629962	10.82	9588872	12.99	8014756	19.25
LOWER LIMIT	657490	9.82	2397218	11.99	2003689	18.25
EPA SAMPLE NO.						
01 VBLK5M	1388863	10.31	5194364	12.47	4249853	18.74
02 ACS-SB110SS4-7'-9'	1371388	10.24	5210191	12.43	4408710	18.73
03						
04						
05						
06						
07						
08						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (BCM) = Bromochloromethane  
IS2 (DFB) = 1,4-Difluorobenzene  
IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area  
AREA LOWER LIMIT = - 50% of internal standard area  
RT UPPER LIMIT = +0.50 minutes of internal standard RT  
RT LOWER LIMIT = -0.50 minutes of internal standard RT

# Column used to flag values outside QC limits with an asterisk.  
\* Values outside of QC limits.

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
ACS-58214 586-13.5-15.5

135155

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212410

Sample wt/vol: 30.2 (g/mL) G

Lab File ID: P1021496\_059.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/17/96

Injection Volume: 1.0(uL)

Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.9

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	370	U
11104-28-2-----Aroclor-1221	760	U
11141-16-5-----Aroclor-1232	370	U
53469-21-9-----Aroclor-1242	370	U
12672-29-6-----Aroclor-1248	3200	
11097-69-1-----Aroclor-1254	370	U
11096-82-5-----Aroclor-1260	370	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACS-58214556-13.5+15.5  
135155DL

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

b Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212410DL

Sample wt/vol: 30.2 (g/mL) G

Lab File ID: P1021496\_104.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/20/96

Injection Volume: 1.0(uL)

Dilution Factor: 100.0

GPC Cleanup: (Y/N) Y pH: 6.9

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	3700	U
11104-28-2-----Aroclor-1221	7600	U
11141-16-5-----Aroclor-1232	3700	U
53469-21-9-----Aroclor-1242	3700	U
12672-29-6-----Aroclor-1248	2700	DJ
11097-69-1-----Aroclor-1254	3700	U
11096-82-5-----Aroclor-1260	3700	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
ACS-88113SS4-7'9'

3SS479

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

b Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960151103

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P2020196\_187.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 01/25/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/01/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/13/96

Injection Volume: 1.0(uL)

Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.4

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	380	U
11104-28-2-----Aroclor-1221	760	U
11141-16-5-----Aroclor-1232	380	U
53469-21-9-----Aroclor-1242	3300	
12672-29-6-----Aroclor-1248	380	U
11097-69-1-----Aroclor-1254	650	P
11096-82-5-----Aroclor-1260	380	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
*ACS-SB113SS4-7-9*

3SS479DL

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

b Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960151103DL

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P2020196\_186.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 01/25/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/01/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/13/96

Injection Volume: 1.0(uL)

Dilution Factor: 100.0

GPC Cleanup: (Y/N) Y pH: 7.4

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----	Aroclor-1016	3800	U
11104-28-2-----	Aroclor-1221	7600	U
11141-16-5-----	Aroclor-1232	3800	U
53469-21-9-----	Aroclor-1242	3600	DJ
12672-29-6-----	Aroclor-1248	3800	U
11097-69-1-----	Aroclor-1254	530	DJP
11096-82-5-----	Aroclor-1260	3800	U



1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
*ACS-SB124584-8.5+10.5*

485105

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212406

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P1021496\_060.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/17/96

Injection Volume: 1.0(uL)

Dilution Factor: 2.0

GPC Cleanup: (Y/N) Y pH: 7.5

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	75	U
11104-28-2-----Aroclor-1221	150	U
11141-16-5-----Aroclor-1232	75	U
53469-21-9-----Aroclor-1242	75	U
12672-29-6-----Aroclor-1248	2200	P
11097-69-1-----Aroclor-1254	1200	P
11096-82-5-----Aroclor-1260	340	P

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
*ACS-SB124554-8.5-10.5*

485105DL

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212406DL

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P1021496\_044.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 01/25/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/16/96

Injection Volume: 1.0(uL)

Dilution Factor: 20.0

GPC Cleanup: (Y/N) Y pH: 7.5

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	750	U
11104-28-2-----Aroclor-1221	1500	U
11141-16-5-----Aroclor-1232	750	U
53469-21-9-----Aroclor-1242	750	U
12672-29-6-----Aroclor-1248	3700	D
11097-69-1-----Aroclor-1254	1900	DP
11096-82-5-----Aroclor-1260	510	DJP

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
ACS-SB127553-6'8'

7SS368

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212407

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: P1021496\_046.D

% Moisture: 27 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/16/96

Injection Volume: 1.0(uL)

Dilution Factor: 20.0

GPC Cleanup: (Y/N) Y pH: 5.9

Sulfur Cleanup: (Y/N) N

CAS NO.

COMPOUND

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

Q

12674-11-2-----Aroclor-1016	900	U
11104-28-2-----Aroclor-1221	1800	U
11141-16-5-----Aroclor-1232	900	U
53469-21-9-----Aroclor-1242	900	U
12672-29-6-----Aroclor-1248	900	U
11097-69-1-----Aroclor-1254	35000	
11096-82-5-----Aroclor-1260	900	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
ACS-SB127553-6-8

7SS368DL

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212407DL

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: P1021496\_040.D

% Moisture: 27 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/16/96

Injection Volume: 1.0(uL)

Dilution Factor: 200.0

GPC Cleanup: (Y/N) Y pH: 5.9

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	9000	U
11104-28-2-----Aroclor-1221	18000	U
11141-16-5-----Aroclor-1232	9000	U
53469-21-9-----Aroclor-1242	9000	U
12672-29-6-----Aroclor-1248	9000	U
11097-69-1-----Aroclor-1254	44000	D
11096-82-5-----Aroclor-1260	9000	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
*ACS-88128SS3-6-8*

8SS368

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212408

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: P1021496\_047.D

% Moisture: 20 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/16/96

Injection Volume: 1.0(uL)

Dilution Factor: 20.0

GPC Cleanup: (Y/N) Y pH: 6.7

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----	Aroclor-1016	820	U
11104-28-2-----	Aroclor-1221	1700	U
11141-16-5-----	Aroclor-1232	820	U
53469-21-9-----	Aroclor-1242	820	U
12672-29-6-----	Aroclor-1248	820	U
11097-69-1-----	Aroclor-1254	7500	P
11096-82-5-----	Aroclor-1260	7300	P

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
ACS-DB/28553-6-8

8SS368DL

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Code: IEA Case No.: 1589-126 SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212408DL

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: P1021496\_041.D

% Moisture: 20 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/01/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/16/96

Injection Volume: 1.0(uL)

Dilution Factor: 200.0

GPC Cleanup: (Y/N) Y pH: 6.7

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	8200	U
11104-28-2-----Aroclor-1221	17000	U
11141-16-5-----Aroclor-1232	8200	U
53469-21-9-----Aroclor-1242	8200	U
12672-29-6-----Aroclor-1248	8200	U
11097-69-1-----Aroclor-1254	12000	D
11096-82-5-----Aroclor-1260	12000	D

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
ACS-SB129SS5-11-13

S51113

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212409

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P1021496\_061.D

% Moisture: 11 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/17/96

Injection Volume: 1.0(uL)

Dilution Factor: 2.0

SPC Cleanup: (Y/N) Y pH: 8.1

Sulfur Cleanup: (Y/N) N

CAS NO.

COMPOUND

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

Q

12674-11-2-----Aroclor-1016	74	U
11104-28-2-----Aroclor-1221	150	U
11141-16-5-----Aroclor-1232	74	U
53469-21-9-----Aroclor-1242	74	U
12672-29-6-----Aroclor-1248	1200	P
11097-69-1-----Aroclor-1254	760	P
11096-82-5-----Aroclor-1260	74	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
ACS-88129SS5-11-13

S51113DL

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212409DL

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P1021496\_045.D

% Moisture: 11 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/16/96

Injection Volume: 1.0(uL)

Dilution Factor: 20.0

GPC Cleanup: (Y/N) Y pH: 8.1

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	740	U
11104-28-2-----Aroclor-1221	1500	U
11141-16-5-----Aroclor-1232	740	U
53469-21-9-----Aroclor-1242	740	U
12672-29-6-----Aroclor-1248	1600	D
11097-69-1-----Aroclor-1254	710	DJP
11096-82-5-----Aroclor-1260	740	U



1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
ACS-58129SS 5-11-13'

S51113MS

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212409MS

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P1021496\_062.D

% Moisture: 11 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/17/96

Injection Volume: 1.0(uL)

Dilution Factor: 2.0

GPC Cleanup: (Y/N) Y pH: 8.1

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----	Aroclor-1016	74	U
11104-28-2-----	Aroclor-1221	150	U
11141-16-5-----	Aroclor-1232	74	U
53469-21-9-----	Aroclor-1242	74	U
12672-29-6-----	Aroclor-1248	990	P
11097-69-1-----	Aroclor-1254	1300	P
11096-82-5-----	Aroclor-1260	74	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
ACS-SB129555-11-13

S51113MSD

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

b Code: IEA Case No.: 1589-126 SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212409MSD

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P1021496\_063.D

% Moisture: 11 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/17/96

Injection Volume: 1.0(uL)

Dilution Factor: 2.0

GPC Cleanup: (Y/N) Y pH: 8.1

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----	Aroclor-1016	74	U
11104-28-2-----	Aroclor-1221	150	U
11141-16-5-----	Aroclor-1232	74	U
53469-21-9-----	Aroclor-1242	74	U
12672-29-6-----	Aroclor-1248	1000	P
11097-69-1-----	Aroclor-1254	1100	P
11096-82-5-----	Aroclor-1260	74	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
*ACS-SB12855 3-6-8 Dup*

SS368D

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212411

Sample wt/vol: 30.2 (g/mL) G

Lab File ID: P1021496\_058.D

% Moisture: 16 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/17/96

Injection Volume: 1.0(uL)

Dilution Factor: 20.0

GPC Cleanup: (Y/N) Y pH: 7.8

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	780	U
11104-28-2-----Aroclor-1221	1600	U
11141-16-5-----Aroclor-1232	780	U
53469-21-9-----Aroclor-1242	780	U
12672-29-6-----Aroclor-1248	780	U
11097-69-1-----Aroclor-1254	4200	P
11096-82-5-----Aroclor-1260	3100	

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
ACS 86128853-6-8 DJP

SS368DDL

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

b Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960212411DL

Sample wt/vol: 30.2 (g/mL) G

Lab File ID: P1021496\_042.D

% Moisture: 16 decanted: (Y/N) N

Date Received: 02/01/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/16/96

Injection Volume: 1.0(uL)

Dilution Factor: 200.0

GPC Cleanup: (Y/N) Y pH: 7.8

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	7800	U
11104-28-2-----Aroclor-1221	16000	U
11141-16-5-----Aroclor-1232	7800	U
53469-21-9-----Aroclor-1242	7800	U
12672-29-6-----Aroclor-1248	7800	U
11097-69-1-----Aroclor-1254	4600	DJP
11096-82-5-----Aroclor-1260	3700	DJ

# PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
ACS-SB112555-911

SS5911

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960151102

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P2020196\_189.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 01/25/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/01/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/13/96

Injection Volume: 1.0(uL)

Dilution Factor: 50.0

GPC Cleanup: (Y/N) Y pH: 7.6

Sulfur Cleanup: (Y/N) N

CAS NO.

COMPOUND

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

Q

12674-11-2-----Aroclor-1016	1900	U
11104-28-2-----Aroclor-1221	3800	U
11141-16-5-----Aroclor-1232	1900	U
53469-21-9-----Aroclor-1242	1900	U
12672-29-6-----Aroclor-1248	3000	P
11097-69-1-----Aroclor-1254	4500	P
11096-82-5-----Aroclor-1260	1900	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
*ACS-SB112555-9-11'*

SS5911DL

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960151102DL

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P2020196\_188.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 01/25/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/01/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/13/96

Injection Volume: 1.0(uL)

Dilution Factor: 500.0

GPC Cleanup: (Y/N) Y pH: 7.6

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	19000	U
11104-28-2-----Aroclor-1221	38000	U
11141-16-5-----Aroclor-1232	19000	U
53469-21-9-----Aroclor-1242	19000	U
12672-29-6-----Aroclor-1248	3400	DJP
11097-69-1-----Aroclor-1254	5700	DJP
11096-82-5-----Aroclor-1260	19000	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
405-88112555-9-11

SS5911MS

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960151102MS

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P2020196\_192.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 01/25/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/01/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/13/96

Injection Volume: 1.0(uL)

Dilution Factor: 50.0

GPC Cleanup: (Y/N) Y pH: 7.6

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	1900	U
11104-28-2-----Aroclor-1221	3800	U
11141-16-5-----Aroclor-1232	1900	U
53469-21-9-----Aroclor-1242	1900	U
12672-29-6-----Aroclor-1248	4000	P
11097-69-1-----Aroclor-1254	5700	P
11096-82-5-----Aroclor-1260	1900	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO. *✓*  
*ACS-5B112SS5-9-91*

SS5911MSD

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: 960151102MSD

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P2020196\_193.D

% Moisture: 12 decanted: (Y/N) N

Date Received: 01/25/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/01/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/14/96

Injection Volume: 1.0(uL)

Dilution Factor: 50.0

GPC Cleanup: (Y/N) Y pH: 7.6

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	1900	U
11104-28-2-----Aroclor-1221	3800	U
11141-16-5-----Aroclor-1232	1900	U
53469-21-9-----Aroclor-1242	1900	U
12672-29-6-----Aroclor-1248	3400	P
11097-69-1-----Aroclor-1254	4900	P
11096-82-5-----Aroclor-1260	1900	U



2F  
SOIL PESTICIDE SURROGATE RECOVERY

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA

Case No.: 1589-126

SDG No.: 01511

GC Column(1): RTX-35

ID: 0.53 (mm)

GC Column(2): DB-1701

ID: 0.53 (mm)

	CLIENT SAMPLE NO.	TCX 1 %REC #	TCX 2 %REC #	DCB 1 %REC #	DCB 2 %REC #	OTHER (1)	OTHER (2)	TOT OUT
01	135155	11D	5D	26D	39D			0
02	135155DL	0D	0D	0D	0D			0
03	485105	52D	27D	56D	47D			0
04	485105DL	0D	0D	0D	0D			0
05	7SS368	0D	0D	0D	0D			0
06	7SS368DL	0D	0D	0D	0D			0
07	8SS368	0D	0D	0D	0D			0
08	8SS368DL	0D	0D	0D	0D			0
09	PBLK92	94	93	101	93			0
10	S51113	67	35D	59D	115			0
11	S51113DL	0D	0D	0D	0D			0
12	S51113MS	55D	26D	48D	354D			0
13	S51113MSD	54D	25D	48D	338D			0
14	SS368D	0D	0D	0D	0D			0
15	SS368DDL	0D	0D	0D	0D			0
16								
17								
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22								
23								
24								
25								
26								
27								
28								
29								
30								

ADVISORY  
QC LIMITS

TCX = Tetrachloro-m-xylene  
DCB = Decachlorobiphenyl

(60-150)  
(60-150)

# Column to be used to flag recovery values  
\* Values outside of QC limits  
D Surrogate diluted out

2F  
SOIL PESTICIDE SURROGATE RECOVERY

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA

Case No.: 1589-126

SDG No.: 01511

GC Column(1): DB-1701

ID: 0.53 (mm)

GC Column(2): RTX-35

ID: 0.53 (mm)

	CLIENT SAMPLE NO.	TCX 1 %REC #	TCX 2 %REC #	DCB 1 %REC #	DCB 2 %REC #	OTHER (1)	OTHER (2)	TOT OUT
01	3SS479	10D	13D	16D	0D			0
02	3SS479DL	0D	0D	0D	0D			0
03	PBLK82	88	111	80	123			0
04	SS5911	0D	0D	0D	0D			0
05	SS5911DL	0D	0D	0D	0D			0
06	SS5911MS	0D	0D	0D	0D			0
07	SS5911MSD	0D	0D	0D	0D			0
08								
09								
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28								
29								
30								

ADVISORY  
QC LIMITS  
(60-150)  
(60-150)

TCX = Tetrachloro-m-xylene  
DCB = Decachlorobiphenyl

# Column to be used to flag recovery values  
\* Values outside of QC limits  
D Surrogate diluted out

3F  
SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: INDUSTRIAL & ENVIRONMENTA Contract: SOW 1/91

Job Code: IEA

Case No.: 1589-126

SDG No.: 01511

Matrix Spike - Client Sample No.: S51113

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC. LIMITS REC.
Aroclor-1260	370	0.0	0.0	0*	60-140

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
roclor-1260	370	0.0	0*	0	40	60-140

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits

RPD: 0 out of 1 outside limits

Spike Recovery: 2 out of 2 outside limits

COMMENTS:

3F  
SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126 SDG No.: 01511

Matrix Spike - Client Sample No.: SS5911

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC. LIMITS REC.
Aroclor-1260	380	0.0	0.0	0*	60-140

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
roclor-1260	380	0.0	0*	0	40	60-140

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits

RPD: 0 out of 1 outside limits

Spike Recovery: 2 out of 2 outside limits

COMMENTS:

4C  
PESTICIDE METHOD BLANK SUMMARY

CLIENT SAMPLE NO.

PBLK82

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126 SDG No.: 01511

Lab Sample ID: PBLK82 Lab File ID: P2020196\_148.D

Matrix:(soil/water) SOIL Extraction:(SepF,Cont/Sonc) SONC

Sulfur Cleanup: (Y/N) N Date Extracted: 02/01/96

Date Analyzed (1): 02/10/96 Date Analyzed (2): 02/15/96

Time Analyzed (1): 2327 Time Analyzed (2): 2209

Instrument ID (1): HP5890P2 Instrument ID (2): HP5890P1

GC Column (1):DB-1701 ID: 0.53(mm) GC Column (2):RTX-35 ID: 0.53(mm)

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED 1	DATE ANALYZED 2
01	3SS479	960151103	02/13/96	02/16/96
02	3SS479DL	960151103DL	02/13/96	02/16/96
03	SS5911	960151102	02/13/96	02/16/96
04	SS5911DL	960151102DL	02/13/96	02/15/96
05	SS5911MS	960151102MS	02/13/96	02/16/96
06	SS5911MSD	960151102MSD	02/14/96	02/16/96
07				
08				
09				
10				
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12				
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26				

COMMENTS: \_\_\_\_\_

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PBLK82

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: PBLK82

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P2020196\_148.D

% Moisture: 0 decanted: (Y/N) N

Date Received: / /

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/01/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/10/96

Injection Volume: 1.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: \_\_\_\_\_

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	33	U
11104-28-2-----Aroclor-1221	67	U
11141-16-5-----Aroclor-1232	33	U
53469-21-9-----Aroclor-1242	33	U
12672-29-6-----Aroclor-1248	33	U
11097-69-1-----Aroclor-1254	33	U
11096-82-5-----Aroclor-1260	33	U

4C  
PESTICIDE METHOD BLANK SUMMARY

CLIENT SAMPLE NO.

PBLK92

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126 SDG No.: 01511

Lab Sample ID: PBLK92 Lab File ID: P1021496\_039.D

Matrix:(soil/water) SOIL Extraction:(SepF,Cont/Sonc) SONC

Sulfur Cleanup: (Y/N) N Date Extracted: 02/09/96

Date Analyzed (1): 02/16/96 Date Analyzed (2): 02/17/96

Time Analyzed (1): 1257 Time Analyzed (2): 0926

Instrument ID (1): HP5890P1 Instrument ID (2): HP5890P2

GC Column (1):RTX-35 ID: 0.53(mm) GC Column (2):DB-1701 ID: 0.53(mm)

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED 1	DATE ANALYZED 2
01	135155	960212410	02/17/96	02/23/96
02	135155DL	960212410DL	02/20/96	02/23/96
03	485105	960212406	02/17/96	02/25/96
04	485105DL	960212406DL	02/16/96	02/17/96
05	7SS368	960212407	02/16/96	02/17/96
06	7SS368DL	960212407DL	02/16/96	02/17/96
07	8SS368	960212408	02/16/96	02/23/96
08	8SS368DL	960212408DL	02/16/96	02/17/96
09	S51113	960212409	02/17/96	02/23/96
10	S51113DL	960212409DL	02/16/96	02/17/96
11	S51113MS	960212409MS	02/17/96	02/23/96
12	S51113MSD	960212409MSD	02/17/96	02/23/96
13	SS368D	960212411	02/17/96	02/23/96
14	SS368DDL	960212411DL	02/16/96	02/17/96
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21				
22				
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24				
25				
26				

COMMENTS:

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PBLK92

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-126

SDG No.: 01511

Matrix: (soil/water) SOIL

Lab Sample ID: PBLK92

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P1021496\_039.D

% Moisture: 0 decanted: (Y/N) N

Date Received: / /

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/09/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 02/16/96

Injection Volume: 1.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: \_\_\_\_\_

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	33	U
11104-28-2-----Aroclor-1221	67	U
11141-16-5-----Aroclor-1232	33	U
53469-21-9-----Aroclor-1242	33	U
12672-29-6-----Aroclor-1248	33	U
11097-69-1-----Aroclor-1254	33	U
11096-82-5-----Aroclor-1260	33	U



IEA Assigned Number Index

Case No.: 1589-126

SDG No.: 01511

IEA Lab Sample Number	Sample Number	Abbreviated Sample Number
9601511-01	ACS-SB110SS4-7'-9'	OSS479
9601511-02	ACS-SB112SS5-9'-11'	SS5911
9601511-03	ACS-SB113SS4-7'-9'	3SS479
9601511-21	HB01511	HB
9602124-04	ACS-SB118SS3-6'-8'	8SS368
9602124-05	ACS-SB119SS3-6'-8'	9SS368
9602124-06	ACS-SB124SS4-8.5'-10.5'	485105
9602124-07	ACS-SB127SS3-6'-8'	7SS368
9602124-08	ACS-SB128SS3-6'-8'	8SS368
9602124-09	ACS-SB129SS5-11'-13'	S51113
9602124-10	ACS-SB214SS6-13.5'-15.5'	135155
9602124-11	ACS-SB128SS3-6'-8' DUP	SS368D

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACS-SB142SS3-6'-8'

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-134

SDG No.: 02301

Matrix: (soil/water) SOIL

Lab Sample ID: 960230101

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0219E03.D

Level: (low/med) MED

Date Received: 02/13/96

% Moisture: not dec. 17

Date Analyzed: 02/19/96

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 20.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:

CAS NO.      COMPOUND      (ug/L or ug/Kg)      ug/kg      Q

74-87-3	Chloromethane	29000	U
74-83-9	Bromomethane	29000	U
75-01-4	Vinyl Chloride	29000	U
75-00-3	Chloroethane	29000	U
75-09-2	Methylene Chloride	29000	U
67-64-1	Acetone	29000	U
75-15-0	Carbon Disulfide	29000	U
75-35-4	1,1-Dichloroethene	29000	U
75-34-3	1,1-Dichloroethane	29000	U
540-59-0	1,2-Dichloroethene (total)	12000	J
67-66-3	Chloroform	29000	U
107-06-2	1,2-Dichloroethane	29000	U
78-93-3	2-Butanone	29000	U
71-55-6	1,1,1-Trichloroethane	36000	
56-23-5	Carbon Tetrachloride	29000	U
75-27-4	Bromodichloromethane	29000	U
78-87-5	1,2-Dichloropropane	29000	U
10061-01-5	cis-1,3-Dichloropropene	29000	U
79-01-6	Trichloroethene	29000	U
124-48-1	Dibromochloromethane	29000	U
79-00-5	1,1,2-Trichloroethane	29000	U
71-43-2	Benzene	29000	U
10061-02-6	Trans-1,3-Dichloropropene	29000	U
75-25-2	Bromoform	29000	U
108-10-1	4-Methyl-2-Pentanone	29000	U
591-78-6	2-Hexanone	29000	U
127-18-4	Tetrachloroethene	29000	U
108-88-3	Toluene	68000	
79-34-5	1,1,2,2-Tetrachloroethane	29000	U
108-90-7	Chlorobenzene	29000	U
100-41-4	Ethylbenzene	31000	
100-42-5	Styrene	29000	U
1330-20-7	Xylene (total)	200000	

CLIENT SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

ACS-SB142SS3-6'-8'

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

**Case No. : 1589-134**

SDG No.: 02301

Matrix: (soil/water) SOIL

Lab Sample ID: 960230101

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0219E03.D

Level: (low/med) MED

Date Received: 02/13/96

% Moisture: not dec. 17

Date Analyzed: 02/19/96

GC Column: DB-624 ID: .53 (mm)

Dilution Factor: 20.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

Number TICs Found: 10

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/kg

[illegible]

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACS-SB143SS3-6'-8'

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-134

SDG No.: 02301

Matrix: (soil/water) SOIL

Lab Sample ID: 960230102

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0219513.D

Level: (low/med) MED

Date Received: 02/13/96

% Moisture: not dec. 23

Date Analyzed: 02/19/96

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 1.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) ug/kg Q

74-87-3	Chloromethane	1600	U
74-83-9	Bromomethane	1600	U
75-01-4	Vinyl Chloride	1600	U
75-00-3	Chloroethane	1600	U
75-09-2	Methylene Chloride	1600	U
67-64-1	Acetone	1600	U
75-15-0	Carbon Disulfide	1600	U
75-35-4	1,1-Dichloroethene	1600	U
75-34-3	1,1-Dichloroethane	1600	U
540-59-0	1,2-Dichloroethene (total)	1600	U
67-66-3	Chloroform	1600	U
107-06-2	1,2-Dichloroethane	1600	U
78-93-3	2-Butanone	1600	U
71-55-6	1,1,1-Trichloroethane	1600	U
56-23-5	Carbon Tetrachloride	1600	U
75-27-4	Bromodichloromethane	1600	U
78-87-5	1,2-Dichloropropane	1600	U
10061-01-5	cis-1,3-Dichloropropene	1600	U
79-01-6	Trichloroethene	1600	U
124-48-1	Dibromochloromethane	1600	U
79-00-5	1,1,2-Trichloroethane	1600	U
71-43-2	Benzene	1600	U
10061-02-6	Trans-1,3-Dichloropropene	1600	U
75-25-2	Bromoform	1600	U
108-10-1	4-Methyl-2-Pentanone	1600	U
591-78-6	2-Hexanone	1600	U
127-18-4	Tetrachloroethene	760	J
108-88-3	Toluene	1600	U
79-34-5	1,1,2,2-Tetrachloroethane	1600	U
108-90-7	Chlorobenzene	1600	U
100-41-4	Ethylbenzene	1600	U
100-42-5	Styrene	1600	U
1330-20-7	Xylene (total)	1600	U

VOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

ACS-SB143SS3-6'-8'

Lab Name: IEA-NC

Method: SOW 1/91

**Lab Code: IEA**

**Case No.: 1589-134**

SDG No.: 02301

Matrix: (soil/water) SOIL

Lab Sample ID: 960230102

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0219513.D

Level: (low/med) MED

Date Received: 02/13/96

% Moisture: not dec. 23

Date Analyzed: 02/19/96

GC Column: DB-624 ID: .53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100 (uL)

Number TICs Found: 10

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/kg

[illegible]

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACS-SB143SS3-6'-8' D

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-134

SDG No.: 02301

Matrix: (soil/water) SOIL

Lab Sample ID: 960230103

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0219514.D

Level: (low/med) MED

Date Received: 02/13/96

% Moisture: not dec. 20

Date Analyzed: 02/19/96

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 1.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) ug/kg Q

74-87-3	Chloromethane	1500	U
74-83-9	Bromomethane	1500	U
75-01-4	Vinyl Chloride	1500	U
75-00-3	Chloroethane	1500	U
75-09-2	Methylene Chloride	1500	U
67-64-1	Acetone	1500	U
75-15-0	Carbon Disulfide	1500	U
75-35-4	1,1-Dichloroethene	1500	U
75-34-3	1,1-Dichloroethane	1500	U
540-59-0	1,2-Dichloroethene (total)	1500	U
67-66-3	Chloroform	1500	U
107-06-2	1,2-Dichloroethane	1500	U
78-93-3	2-Butanone	1500	U
71-55-6	1,1,1-Trichloroethane	1500	U
56-23-5	Carbon Tetrachloride	1500	U
75-27-4	Bromodichloromethane	1500	U
78-87-5	1,2-Dichloropropane	1500	U
10061-01-5	cis-1,3-Dichloropropene	1500	U
79-01-6	Trichloroethene	1500	U
124-48-1	Dibromochloromethane	1500	U
79-00-5	1,1,2-Trichloroethane	1500	U
71-43-2	Benzene	1500	U
10061-02-6	Trans-1,3-Dichloropropene	1500	U
75-25-2	Bromoform	1500	U
108-10-1	4-Methyl-2-Pentanone	1500	U
591-78-6	2-Hexanone	1500	U
127-18-4	Tetrachloroethene	690	J
108-88-3	Toluene	1500	U
79-34-5	1,1,2,2-Tetrachloroethane	1500	U
108-90-7	Chlorobenzene	1500	U
100-41-4	Ethylbenzene	1500	U
100-42-5	Styrene	1500	U
1330-20-7	Xylene (total)	1500	U

CLIENT SAMPLE NO.

ACS-SB143SS3-6'-8' D

Lab Name: IEA-NC

Method: SOW 1/91

**Lab Code: IEA**

**Case No.: 1589-134**

SDG No.: 02301

Matrix: (soil/water) SOIL

Lab Sample ID: 960230103

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0219514.D

Level: (low/med) MED

Date Received: 02/13/96

% Moisture: not dec. 20

Date Analyzed: 02/19/96

GC Column: DB-624 ID: .53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: 10000 (uL)

Soil Aliquot Volume: 100 (uL)

Number TICs Found: 10

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/kg

[illegible]

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VBLK5F

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-134

SDG No.: 02301

Matrix: (soil/water) SOIL

Lab Sample ID: VBLK5F

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0219503.D

Level: (low/med) MED

Date Received:

% Moisture: not dec. 0

Date Analyzed: 02/19/96

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 1.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) ug/kg Q

74-87-3	Chloromethane	1200	U
74-83-9	Bromomethane	1200	U
75-01-4	Vinyl Chloride	1200	U
75-00-3	Chloroethane	1200	U
75-09-2	Methylene Chloride	1200	U
67-64-1	Acetone	1200	U
75-15-0	Carbon Disulfide	1200	U
75-35-4	1,1-Dichloroethene	1200	U
75-34-3	1,1-Dichloroethane	1200	U
540-59-0	1,2-Dichloroethene (total)	1200	U
67-66-3	Chloroform	1200	U
107-06-2	1,2-Dichloroethane	1200	U
78-93-3	2-Butanone	1200	U
71-55-6	1,1,1-Trichloroethane	1200	U
56-23-5	Carbon Tetrachloride	1200	U
75-27-4	Bromodichloromethane	1200	U
78-87-5	1,2-Dichloropropane	1200	U
10061-01-5	cis-1,3-Dichloropropene	1200	U
79-01-6	Trichloroethene	1200	U
124-48-1	Dibromochloromethane	1200	U
79-00-5	1,1,2-Trichloroethane	1200	U
71-43-2	Benzene	1200	U
10061-02-6	Trans-1,3-Dichloropropene	1200	U
75-25-2	Bromoform	1200	U
108-10-1	4-Methyl-2-Pentanone	1200	U
591-78-6	2-Hexanone	1200	U
127-18-4	Tetrachloroethene	1200	U
108-88-3	Toluene	1200	U
79-34-5	1,1,2,2-Tetrachloroethane	1200	U
108-90-7	Chlorobenzene	1200	U
100-41-4	Ethylbenzene	1200	U
100-42-5	Styrene	1200	U
1330-20-7	Xylene (total)	1200	U



CLIENT SAMPLE NO.

Method: SOW 1/91

SDG No.: 02301

Lab Sample ID: VBLK5F

Lab File ID: 0219503.D

Date Received:

Date Analyzed: 02/19/96

Dilution Factor: 1.0

Soil Aliquot Volume: 100 (uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/kg

[illegible]

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

VBULK5H

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-134

SDG No.: 02301

Matrix: (soil/water) SOIL

Lab Sample ID: VBLK5H

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0219E02.D

Level: (low/med) MED

Date Received:

% Moisture: not dec. 0

Date Analyzed: 02/19/96

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 1.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/kg Q

74-87-3	Chloromethane	1200	U
74-83-9	Bromomethane	1200	U
75-01-4	Vinyl Chloride	1200	U
75-00-3	Chloroethane	1200	U
75-09-2	Methylene Chloride	1200	U
67-64-1	Acetone	1200	U
75-15-0	Carbon Disulfide	1200	U
75-35-4	1,1-Dichloroethene	1200	U
75-34-3	1,1-Dichloroethane	1200	U
540-59-0	1,2-Dichloroethene (total)	1200	U
67-66-3	Chloroform	1200	U
107-06-2	1,2-Dichloroethane	1200	U
78-93-3	2-Butanone	1200	U
71-55-6	1,1,1-Trichloroethane	1200	U
56-23-5	Carbon Tetrachloride	1200	U
75-27-4	Bromodichloromethane	1200	U
78-87-5	1,2-Dichloropropane	1200	U
10061-01-5	cis-1,3-Dichloropropene	1200	U
79-01-6	Trichloroethene	1200	U
124-48-1	Dibromochloromethane	1200	U
79-00-5	1,1,2-Trichloroethane	1200	U
71-43-2	Benzene	1200	U
10061-02-6	Trans-1,3-Dichloropropene	1200	U
75-25-2	Bromoform	1200	U
108-10-1	4-Methyl-2-Pentanone	1200	U
591-78-6	2-Hexanone	1200	U
127-18-4	Tetrachloroethene	1200	U
108-88-3	Toluene	1200	U
79-34-5	1,1,2,2-Tetrachloroethane	1200	U
108-90-7	Chlorobenzene	1200	U
100-41-4	Ethylbenzene	1200	U
100-42-5	Styrene	1200	U
1330-20-7	Xylene (total)	1200	U

CLIENT SAMPLE NO.

1E

Method: SOW 1/91

**VBLK5H**

SDG No.: 02301

Lab Sample ID: VBLK5H

Lab File ID: 0219E02.D

Date Received:

Date Analyzed: 02/19/96

Dilution Factor: 1.0

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:  
(ug/L or ug/Kg) ug/kg

[illegible]

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACS-SB142SS3-6'-8'MS

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-134

SDG No.: 02301

Matrix: (soil/water) SOIL

Lab Sample ID: 960230101MS

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0219E04.D

Level: (low/med) MED

Date Received: 02/13/96

% Moisture: not dec. 17

Date Analyzed: 02/19/96

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 20.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) ug/kg Q

74-87-3	Chloromethane	29000	U
74-83-9	Bromomethane	29000	U
75-01-4	Vinyl Chloride	29000	U
75-00-3	Chloroethane	29000	U
75-09-2	Methylene Chloride	29000	U
67-64-1	Acetone	29000	U
75-15-0	Carbon Disulfide	29000	U
75-35-4	1,1-Dichloroethene	14000	J
75-34-3	1,1-Dichloroethane	29000	U
540-59-0	1,2-Dichloroethene (total)	12000	J
67-66-3	Chloroform	29000	U
107-06-2	1,2-Dichloroethane	29000	U
78-93-3	2-Butanone	29000	U
71-55-6	1,1,1-Trichloroethane	34000	
56-23-5	Carbon Tetrachloride	29000	U
75-27-4	Bromodichloromethane	29000	U
78-87-5	1,2-Dichloropropane	29000	U
10061-01-5	cis-1,3-Dichloropropene	29000	U
79-01-6	Trichloroethene	12000	J
124-48-1	Dibromochloromethane	29000	U
79-00-5	1,1,2-Trichloroethane	29000	U
71-43-2	Benzene	16000	J
10061-02-6	Trans-1,3-Dichloropropene	29000	U
75-25-2	Bromoform	29000	U
108-10-1	4-Methyl-2-Pentanone	29000	U
591-78-6	2-Hexanone	29000	U
127-18-4	Tetrachloroethene	29000	U
108-88-3	Toluene	75000	
79-34-5	1,1,2,2-Tetrachloroethane	29000	U
108-90-7	Chlorobenzene	13000	J
100-41-4	Ethylbenzene	28000	J
100-42-5	Styrene	29000	U
1330-20-7	Xylene (total)	180000	

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

ACS-SB142SS3-6'-8'MSD

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-134

SDG No.: 02301

Matrix: (soil/water) SOIL

Lab Sample ID: 960230101MSD

Sample wt/vol: 4 (g/mL) g

Lab File ID: 0219E05.D

Level: (low/med) MED

Date Received: 02/13/96

% Moisture: not dec. 17

Date Analyzed: 02/20/96

GC Column: DB-624 ID: .53(mm)

Dilution Factor: 20.0

Soil Extract Volume: 10000(uL)

Soil Aliquot Volume: 100(uL)

CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) ug/kg Q

74-87-3	Chloromethane	29000	U
74-83-9	Bromomethane	29000	U
75-01-4	Vinyl Chloride	29000	U
75-00-3	Chloroethane	29000	U
75-09-2	Methylene Chloride	29000	U
67-64-1	Acetone	29000	U
75-15-0	Carbon Disulfide	29000	U
75-35-4	1,1-Dichloroethene	12000	J
75-34-3	1,1-Dichloroethane	29000	U
540-59-0	1,2-Dichloroethene (total)	12000	J
67-66-3	Chloroform	29000	U
107-06-2	1,2-Dichloroethane	29000	U
78-93-3	2-Butanone	29000	U
71-55-6	1,1,1-Trichloroethane	34000	
56-23-5	Carbon Tetrachloride	29000	U
75-27-4	Bromodichloromethane	29000	U
78-87-5	1,2-Dichloropropane	29000	U
10061-01-5	cis-1,3-Dichloropropene	29000	U
79-01-6	Trichloroethene	13000	J
124-48-1	Dibromochloromethane	29000	U
79-00-5	1,1,2-Trichloroethane	29000	U
71-43-2	Benzene	16000	J
10061-02-6	Trans-1,3-Dichloropropene	29000	U
75-25-2	Bromoform	29000	U
108-10-1	4-Methyl-2-Pentanone	29000	U
591-78-6	2-Hexanone	29000	U
127-18-4	Tetrachloroethene	5400	J
108-88-3	Toluene	76000	
79-34-5	1,1,2,2-Tetrachloroethane	29000	U
108-90-7	Chlorobenzene	12000	J
100-41-4	Ethylbenzene	29000	J
100-42-5	Styrene	29000	U
1330-20-7	Xylene (total)	190000	

2B  
SOIL VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-134

SDG No.: 02301

Level: (low/med) MED

	CLIENT SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 (DCE) #	OTHER	TOT OUT
01	VBLK5F	101	98	105		0
02	ACS-SB143SS3-6'-8'	101	97	104		0
03	ACS-SB143SS3-6'-8' D	100	100	103		0
04	VBLK5H	98	101	106		0
05	ACS-SB142SS3-6'-8'	98D	100D	102D		0
06	ACS-SB142SS3-6'-8' MS	98D	101D	104D		0
07	ACS-SB142SS3-6'-8' MSD	98D	100D	107D		0
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

QC LIMITS

SMC1 (TOL) = Toluene-d8 (84-138)  
 SMC2 (BFB) = Bromofluorobenzene (59-113)  
 SMC3 (DCE) = 1,2-Dichloroethane-d4 (70-121)

# Column to be used to flag recovery values

\* Values outside of QC limits.

D System Monitoring Compound diluted out

3B  
SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-134

SDG No.: 02301

Matrix Spike - Client Sample No.: ACS-SB142SS3-6'-8' Level: (low/med) MED

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC. LIMITS REC.
1,1-Dichloroethene	7500	0	14000	187 D	59-172
Trichloroethene	7500	0	12000	160 D	62-137
Benzene	7500	0	16000	213 D	66-142
Toluene	7500	68000	75000	93 D	59-139
Chlorobenzene	7500	0	13000	173 D	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS	
					RPD	REC.
1,1-Dichloroethene	7500	12000	160 D	16	22	59-172
Trichloroethene	7500	13000	173 D	8	24	62-137
Benzene	7500	16000	213 D	0	21	66-142
Toluene	7500	76000	107 D	14	21	59-139
Chlorobenzene	7500	12000	160 D	8	21	60-133

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits.

D Spike compound diluted out.

RPD: 0 out of 5 outside limits

Spike Recovery: 7 out of 10 outside limits

COMMENTS:

\_\_\_\_\_

\_\_\_\_\_

4A  
VOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE NO.

VBLK5F

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-134

SDG No.: 02301

Lab File ID: 0219503.D

Lab Sample ID: VBLK5F

Date Analyzed: 02/19/96

Time Analyzed: 09:38

GC Column: DB-624 ID: .53(mm)

Heated Purge: (Y/N) N

Instrument ID: MSD5

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	ACS-SB143SS3-6'-8'	960230102	0219513.D	16:54
02	ACS-SB143SS3-6'-8' D	960230103	0219514.D	17:35
03				
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS:



4A  
VOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE NO.

VBK5H

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-134

SDG No.: 02301

Lab File ID: 0219E02.D

Lab Sample ID: VBK5H

Date Analyzed: 02/19/96

Time Analyzed: 21:34

GC Column: DB-624 ID: .53 (mm)

Heated Purge: (Y/N) N

Instrument ID: MSD5

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	ACS-SB142SS3-6'-8'	960230101	0219E03.D	22:26
02	ACS-SB142SS3-6'-8'MS	960230101MS	0219E04.D	23:25
03	ACS-SB142SS3-6'-8'MSD	960230101MSD	0219E05.D	00:05
04				
05				
06				
07				
08				
09				
10				
11				
12				
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17				
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25				
26				
27				
28				
29				
30				

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_

8A  
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-134

SDG No.: 02301

Lab File ID (Standard): 0219501.D

Date Analyzed: 02/19/96

Instrument ID: MSD5

Time Analyzed: 07:54

GC Column: DB-624

ID: .53(mm)

Heated Purge: (Y/N) N

	IS1 (BCM) AREA #	RT #	IS2 (DFB) AREA #	RT #	IS3 (CBZ) AREA #	RT #
12 HOUR STD	637601	10.26	2325780	12.44	1957828	18.72
UPPER LIMIT	1275202	10.76	4651560	12.94	3915656	19.22
LOWER LIMIT	318800	9.76	1162890	11.94	978914	18.22
EPA SAMPLE NO.						
01 VBLK5F	686565	10.26	2645179	12.45	2139193	18.76
02 ACS-SB143SS3-6'-8'	712404	10.29	2746431	12.48	2250829	18.76
03 ACS-SB143SS3-6'-8' D	699235	10.27	2684784	12.45	2214927	18.73
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (BCM) = Bromochloromethane  
IS2 (DFB) = 1,4-Difluorobenzene  
IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area  
AREA LOWER LIMIT = - 50% of internal standard area  
RT UPPER LIMIT = +0.50 minutes of internal standard RT  
RT LOWER LIMIT = -0.50 minutes of internal standard RT

# Column used to flag values outside QC limits with an asterisk.  
\* Values outside of QC limits.

8A  
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: IEA-NC

Method: SOW 1/91

Lab Code: IEA

Case No.: 1589-134

SDG No.: 02301

Lab File ID (Standard): 0219E01.D

Date Analyzed: 02/19/96

Instrument ID: MSD5

Time Analyzed: 20:41

GC Column: DB-624

ID: .53(mm)

Heated Purge: (Y/N) N

	IS1 (BCM) AREA #	RT #	IS2 (DFB) AREA #	RT #	IS3 (CBZ) AREA #	RT #
12 HOUR STD	779162	10.33	2801133	12.49	2324722	18.76
UPPER LIMIT	1558324	10.83	5602266	12.99	4649444	19.26
LOWER LIMIT	389581	9.83	1400566	11.99	1162361	18.26
EPA SAMPLE NO.						
01 VBLK5H	784543	10.31	2978764	12.49	2443947	18.77
02 ACS-SB142SS3-6'-8'	795935	10.31	2934452	12.49	2468671	18.78
03 ACS-SB142SS3-6'-8'MS	763438	10.32	2829419	12.49	2408820	18.78
04 ACS-SB142SS3-6'-8'MSD	751689	10.29	2841435	12.47	2407546	18.77
05						
06						
07						
08						
09						
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11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (BCM) = Bromochloromethane  
IS2 (DFB) = 1,4-Difluorobenzene  
IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area  
AREA LOWER LIMIT = - 50% of internal standard area  
RT UPPER LIMIT = +0.50 minutes of internal standard RT  
RT LOWER LIMIT = -0.50 minutes of internal standard RT

# Column used to flag values outside QC limits with an asterisk.  
\* Values outside of QC limits.



**SPECIAL INSTRUCTIONS:**

☐ PECFA  
☐ WILUST  
☐ ACT 307  
☐ REPORT DRY WT  
☐ OTHER:

## TURNAROUND

☐ 2 WEEKS (standard)  
☐ 1 WEEK  
☐ 3 DAYS  
☐ 1 DAY

[illegible]

COC Seal #s 92-00075, 96076

RECEIVED: ☐ INTACT ☐ ON ICE TEMP \_\_\_\_\_ OF \_\_\_\_\_

**PROJ. MGR.:**

REF ID: A67

\* Run Duplicate on tag # 9-29853 and ms/ms on tag # 9-29852  
AS well as GC/MS analysis

SIGNATURE	PRINT NAME	COMPANY / TITLE	DATE	TIME
RELINQUISHED BY: <i>[Signature]</i>	<i>David A. Picny</i>	<i>Montgomery Watson / Hyatt, Colorado</i>	<i>7-12-90</i>	<i>1200</i>
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

C-O-C No. 010573

NAME OF COURIER: TEV

AIRBILL NUMBER: 0000000000

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

PBLK06

ab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA

Case No.: 1589-134

SDG No.: 02301

Matrix: (soil/water) SOIL

Lab Sample ID: PBLK06

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P4030296\_147.D

% Moisture: 0 decanted: (Y/N) N

Date Received: / /

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/21/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 03/08/96

Injection Volume: 1.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: \_\_\_\_\_

Sulfur Cleanup: (Y/N) N

CAS NO.

COMPOUND

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

Q

12674-11-2-----Aroclor-1016	33	U
11104-28-2-----Aroclor-1221	67	U
11141-16-5-----Aroclor-1232	33	U
53469-21-9-----Aroclor-1242	33	U
12672-29-6-----Aroclor-1248	33	U
11097-69-1-----Aroclor-1254	33	U
11096-82-5-----Aroclor-1260	33	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO. /  
~~ACS-S6142SS3-6-81~~

3SS3P

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-134

SDG No.: 02301

Matrix: (soil/water) SOIL

Lab Sample ID: 960230104

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: P4030296\_150.D

% Moisture: 18 decanted: (Y/N) N

Date Received: 02/13/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/21/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 03/08/96

Injection Volume: 1.0(uL)

Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.5

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS:	
		(ug/L or ug/Kg) UG/KG	Q
12674-11-2-----	Aroclor-1016	400	U
11104-28-2-----	Aroclor-1221	810	U
11141-16-5-----	Aroclor-1232	400	U
53469-21-9-----	Aroclor-1242	900	CP
12672-29-6-----	Aroclor-1248	400	U
11097-69-1-----	Aroclor-1254	2100	CP
11096-82-5-----	Aroclor-1260	400	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO. **ACS 59142553-6-8-Duf**

3SS3PDL

b Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-134

SDG No.: 02301

Matrix: (soil/water) SOIL

Lab Sample ID: 960230104DL

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: P4030296\_148.D

% Moisture: 18 decanted: (Y/N) N

Date Received: 02/13/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/21/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 03/08/96

Injection Volume: 1.0(uL)

Dilution Factor: 100.0

GPC Cleanup: (Y/N) Y pH: 6.5

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----	Aroclor-1016	4000	U
11104-28-2-----	Aroclor-1221	8100	U
11141-16-5-----	Aroclor-1232	4000	U
53469-21-9-----	Aroclor-1242	700	JP
12672-29-6-----	Aroclor-1248	4000	U
11097-69-1-----	Aroclor-1254	2200	JP
11096-82-5-----	Aroclor-1260	4000	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
ACS-SB143554-8-5-10

3SS4

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-134

SDG No.: 02301

Matrix: (soil/water) SOIL

Lab Sample ID: 960230105

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: P4030296\_153.D

% Moisture: 13 decanted: (Y/N) N

Date Received: 02/13/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/21/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 03/08/96

Injection Volume: 1.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.7

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----Aroclor-1016	38	U
11104-28-2-----Aroclor-1221	77	U
11141-16-5-----Aroclor-1232	38	U
53469-21-9-----Aroclor-1242	1400	CP
12672-29-6-----Aroclor-1248	38	U
11097-69-1-----Aroclor-1254	450	CP
11096-82-5-----Aroclor-1260	38	U



1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
*ACS-SB14354-85-105*  
3SS4DL

ab Name: INDUSTRIAL & ENVIRONMENTA Contract: SOW 1/91  
Lab Code: IEA Case No.: 1589-134 SDG No.: 02301  
Matrix: (soil/water) SOIL Lab Sample ID: 960230105DL  
Sample wt/vol: 30.0 (g/mL) G Lab File ID: P4030296\_149.D  
% Moisture: 13 decanted: (Y/N) N Date Received: 02/13/96  
Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 02/21/96  
Concentrated Extract Volume: 5000(uL) Date Analyzed: 03/08/96  
Injection Volume: 1.0(uL) Dilution Factor: 10.0  
GPC Cleanup: (Y/N) Y pH: 7.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG		Q
12674-11-2-----	Aroclor-1016	380		U
11104-28-2-----	Aroclor-1221	770		U
11141-16-5-----	Aroclor-1232	380		U
53469-21-9-----	Aroclor-1242	1400		DP
12672-29-6-----	Aroclor-1248	380		U
11097-69-1-----	Aroclor-1254	590		DP
11096-82-5-----	Aroclor-1260	380		U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
*ACS-SB143553-68 ms*  
3SS3PMS

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-134

SDG No.: 02301

Matrix: (soil/water) SOIL

Lab Sample ID: 960230104MS

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: P4030296\_151.D

% Moisture: 18 decanted: (Y/N) N

Date Received: 02/13/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/21/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 03/08/96

Injection Volume: 1.0(uL)

Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.5

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----	Aroclor-1016	400	U
11104-28-2-----	Aroclor-1221	810	U
11141-16-5-----	Aroclor-1232	400	U
53469-21-9-----	Aroclor-1242	1300	P
12672-29-6-----	Aroclor-1248	400	U
11097-69-1-----	Aroclor-1254	3200	P
11096-82-5-----	Aroclor-1260	1500	P

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.  
*Acs-58143SS3-6-8-MSD*

3SS3PMSD

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-134

SDG No.: 02301

Matrix: (soil/water) SOIL

Lab Sample ID: 960230104MSD

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: P4030296\_152.D

% Moisture: 18 decanted: (Y/N) N

Date Received: 02/13/96

Extraction: (SepF/Cont/Sonc) SONC

Date Extracted: 02/21/96

Concentrated Extract Volume: 5000(uL)

Date Analyzed: 03/08/96

Injection Volume: 1.0(uL)

Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.5

Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

12674-11-2-----	Aroclor-1016	400	U
11104-28-2-----	Aroclor-1221	810	U
11141-16-5-----	Aroclor-1232	400	U
53469-21-9-----	Aroclor-1242	2000	P
12672-29-6-----	Aroclor-1248	400	U
11097-69-1-----	Aroclor-1254	4900	P
11096-82-5-----	Aroclor-1260	3200	P

2F  
SOIL PESTICIDE SURROGATE RECOVERY

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA

Case No.: 1589-134

SDG No.: 02301

GC Column(1): DB-1701

ID: 0.53 (mm)

GC Column(2): RTX-35

ID: 0.53 (mm)

	CLIENT SAMPLE NO.	TCX 1 %REC #	TCX 2 %REC #	DCB 1 %REC #	DCB 2 %REC #	OTHER (1)	OTHER (2)	TOT OUT
01	3SS3P	29D	130D	80D	130D			0
02	3SS3PDL	0D	0D	0D	0D			0
03	3SS3PMS	42D	354D	332D	362D			0
04	3SS3PMSD	53D	164D	570D	186D			0
05	3SS4	57*	1200*	570*	1400*			4
06	3SS4DL	51D	120D	159D	121D			0
07	PBLK06	46*	96	72	100			1
08								
09								
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29								
30								

ADVISORY  
QC LIMITS

TCX = Tetrachloro-m-xylene  
DCB = Decachlorobiphenyl

(60-150)  
(60-150)

# Column to be used to flag recovery values  
\* Values outside of QC limits  
D Sample diluted

3F  
SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

ab Name: INDUSTRIAL & ENVIRONMENTA Contract: SOW 1/91

Lab Code: IEA Case No.: 1589-134

SDG No.: 02301

Matrix Spike - Client Sample No.: 3SS3P

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC. LIMITS REC.
Aroclor-1260	400	0.0	150	38*	60-140

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
Aroclor-1260	400	320	80	71*	40	60-140

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits

RPD: 1 out of 1 outside limits

Spike Recovery: 1 out of 2 outside limits

COMMENTS:

4C  
PESTICIDE METHOD BLANK SUMMARY

CLIENT SAMPLE NO.

PBLK06

Lab Name: INDUSTRIAL & ENVIRONMENTAL Contract: SOW 1/91

Lab Code: IEA

Case No.: 1589-134

SDG No.: 02301

Lab Sample ID: PBLK06

Lab File ID: P4030296\_147.D

Matrix:(soil/water) SOIL

Extraction:(SepF,Cont/Sonc) SONC

Sulfur Cleanup: (Y/N) N

Date Extracted: 02/21/96

Date Analyzed (1): 03/08/96

Date Analyzed (2): 03/12/96

Time Analyzed (1): 1544

Time Analyzed (2): 2116

Instrument ID (1): HP5890P4

Instrument ID (2): HP5890P1

GC Column (1):DB-1701

ID: 0.53(mm)

GC Column (2):RTX-35

ID: 0.53(mm)

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED 1	DATE ANALYZED 2
01	3SS3P	960230104	03/08/96	03/10/96
02	3SS3PDL	960230104DL	03/08/96	03/10/96
03	3SS3PMS	960230104MS	03/08/96	03/10/96
04	3SS3PMSD	960230104MSD	03/08/96	03/10/96
05	3SS4	960230105	03/08/96	03/10/96
06	3SS4DL	960230105DL	03/08/96	03/10/96
07				
08				
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26				

COMMENTS:

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

149554-8.5/10

Lab Name: IEA-CT Contract: \_\_\_\_\_Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: Z0219Matrix: (soil/water): SOILLab Sample ID: 0219001 **0011**Sample wt/vol: 30 (g/ml) GLab File ID: B5213CLP326% Moisture: 18 decanted: (Y/N) NDate Received: 02/16/96Extraction: (SepF/Cont/Sonc) SONCDate Extracted: 02/16/96Concentrated Extract Volume: 5000 (uL)Date Analyzed: 02/17/96Injection Volume: 1.0 (uL)Dilution Factor: 1.0GPC Cleanup: (Y/N) Y pH: 6.7Sulfur Cleanup: (Y/N) N

CAS NO.

COMPOUND

CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

149557-16/18

Lab Name: IEA-CT Contract: \_\_\_\_\_

Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: 20219

Matrix: (soil/water): SOIL Lab Sample ID: 0219002017

Sample wt/vol: 30 (g/ml) G Lab File ID: B5213CLP327

% Moisture: 20 decanted: (Y/N) N Date Received: 02/16/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 02/16/96

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 02/17/96

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 8.3 Sulfur Cleanup: (Y/N) N

CAS NO. COMPOUND CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	41	U
11104-28-2	Aroclor-1221	84	U
11141-16-5	Aroclor-1232	41	U
53469-21-9	Aroclor-1242	41	U
12672-29-6	Aroclor-1248	41	U
11097-69-1	Aroclor-1254	41	U
11096-82-5	Aroclor-1260	41	U



1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

150553-6/8

Lab Name: IEA-CT Contract: \_\_\_\_\_Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: Z0219

0025

Matrix: (soil/water): SOILLab Sample ID: 0219003Sample wt/vol: 30 (g/ml) GLab File ID: B5213CLP328% Moisture: 19 decanted: (Y/N) NDate Received: 02/16/96Extraction: (SepF/Cont/Sonc) SONCDate Extracted: 02/16/96Concentrated Extract Volume: 5000 (uL)Date Analyzed: 02/17/96Injection Volume: 1.0 (uL)Dilution Factor: 1.0GPC Cleanup: (Y/N) Y pH: 6.9Sulfur Cleanup: (Y/N) N

CAS NO.

COMPOUND

CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	41	U
11104-28-2	Aroclor-1221	83	U
11141-16-5	Aroclor-1232	41	U
53469-21-9	Aroclor-1242	41	U
12672-29-6	Aroclor-1248	500	
11097-69-1	Aroclor-1254	150	
11096-82-5	Aroclor-1260	49.	

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

151553-5/7

Lab Name: IEA-CT Contract: \_\_\_\_\_

Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: Z0219

Matrix: (soil/water): SOIL Lab Sample ID: 0219004 <sup>0036</sup>

Sample wt/vol: 30 (g/ml) G Lab File ID: B5213CLP329

% Moisture: 18 decanted: (Y/N) N Date Received: 02/16/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 02/16/96

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 02/17/96

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.6 Sulfur Cleanup: (Y/N) N

CAS NO. COMPOUND CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

151555-9/11

Lab Name: IEA-CT Contract: \_\_\_\_\_

Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: Z0219

Matrix: (soil/water): SOIL Lab Sample ID: 0219005 0044

Sample wt/vol: 30 (g/ml) G Lab File ID: B5213CLP330

% Moisture: 15 decanted: (Y/N) N Date Received: 02/16/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 02/16/96

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 02/17/96

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7 Sulfur Cleanup: (Y/N) N

CAS NO.

COMPOUND

 CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	39	U
11104-28-2	Aroclor-1221	79	U
11141-16-5	Aroclor-1232	39	U
53469-21-9	Aroclor-1242	39	U
12672-29-6	Aroclor-1248	39	U
11097-69-1	Aroclor-1254	39	U
11096-82-5	Aroclor-1260	39	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

152554-7/9

Lab Name: IEA-CT Contract: \_\_\_\_\_

Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: Z0219 0052

Matrix: (soil/water): SOIL Lab Sample ID: 0219006

Sample wt/vol: 30 (g/ml) G Lab File ID: B5213CLP331

% Moisture: 19 decanted: (Y/N) N Date Received: 02/16/96

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 02/16/96

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 02/17/96

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.9 Sulfur Cleanup: (Y/N) N

CAS NO.

COMPOUND

CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	41	U
11104-28-2	Aroclor-1221	83	U
11141-16-5	Aroclor-1232	41	U
53469-21-9	Aroclor-1242	41	U
12672-29-6	Aroclor-1248	41	U
11097-69-1	Aroclor-1254	41	U
11096-82-5	Aroclor-1260	41	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

152SSS-9/11

Lab Name: IEA-CT Contract: \_\_\_\_\_Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: Z0219Matrix: (soil/water): SOILLab Sample ID: 0219007 0059Sample wt/vol: 30 (g/ml) GLab File ID: B5213CLP332% Moisture: 19 decanted: (Y/N) NDate Received: 02/16/96Extraction: (SepF/Cont/Sonc) SONCDate Extracted: 02/16/96Concentrated Extract Volume: 5000 (uL)Date Analyzed: 02/17/96Injection Volume: 1.0 (uL)Dilution Factor: 1.0GPC Cleanup: (Y/N) Y pH: 7.2Sulfur Cleanup: (Y/N) N

CAS NO.

COMPOUND

CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	41	U
11104-28-2	Aroclor-1221	83	U
11141-16-5	Aroclor-1232	41	U
53469-21-9	Aroclor-1242	41	U
12672-29-6	Aroclor-1248	41	U
11097-69-1	Aroclor-1254	41	U
11096-82-5	Aroclor-1260	41	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

PBLK86

Lab Name: IEA-CT Contract: \_\_\_\_\_

Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: 20219 **0213.**

Matrix: (soil/water): SOIL Lab Sample ID: 021696-B02

Sample wt/vol: 30 (g/ml) G Lab File ID: B5213CLP325

% Moisture: 0 decanted: (Y/N) N Date Received: \_\_\_\_\_

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 02/16/96

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 02/17/96

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: \_\_\_\_\_ Sulfur Cleanup: (Y/N) N

CAS NO.

COMPOUND

 CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	33	U
11104-28-2	Aroclor-1221	67	U
11141-16-5	Aroclor-1232	33	U
53469-21-9	Aroclor-1242	33	U
12672-29-6	Aroclor-1248	33	U
11097-69-1	Aroclor-1254	33	U
11096-82-5	Aroclor-1260	33	U

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

149554-8.5/1

Lab Name: IEA-CT Contract: \_\_\_\_\_  
Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: Z0219  
Matrix: (soil/water): SOIL Lab Sample ID: 0219001MS  
Sample wt/vol: 30 (g/ml) G Lab File ID: B5213CLP333 **238**  
% Moisture: 18 decanted: (Y/N) N Date Received: 02/16/96  
Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 02/16/96  
Concentrated Extract Volume: 5000 (uL) Date Analyzed: 02/17/96  
Injection Volume: 1.0 (uL) Dilution Factor: 1.0  
GPC Cleanup: (Y/N) Y pH: 6.7 Sulfur Cleanup: (Y/N) N

CAS NO. COMPOUND CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	480	
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	380	P

1D  
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

149554-8.5/1

Lab Name: IEA-CT Contract: \_\_\_\_\_Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: Z0219Matrix: (soil/water): SOILLab Sample ID: 0219001MSD **249**Sample wt/vol: 30 (g/ml) GLab File ID: B5213CLP334% Moisture: 18 decanted: (Y/N) NDate Received: 02/16/96Extraction: (SepF/Cont/Sonc) SONCDate Extracted: 02/16/96Concentrated Extract Volume: 5000 (uL)Date Analyzed: 02/17/96Injection Volume: 1.0 (uL)Dilution Factor: 1.0GPC Cleanup: (Y/N) Y pH: 6.7Sulfur Cleanup: (Y/N) N

CAS NO. COMPOUND

CONCENTRATION UNITS: Q  
(ug/L or ug/Kg) UG/KG

12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	460	
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	320	



2F  
SOIL PESTICIDE SURROGATE RECOVERY

Lab Name: IEA-CT Contract: \_\_\_\_\_

Lab Code: IEACT Case No.: 0219 SAS No.: \_\_\_\_\_ SDG No.: Z0219

GC Column(1): DB-1701 ID: 0.53 (mm) GC Column(2): RTX-35 ID: 0.53 (mm)

	EPA SAMPLE NO.	TCX %REC	1 #	TCX %REC	2 #	DCB %REC	1 #	DCB %REC	2 #	OTHER (1)	OTHER (2)	TOT OUT
01	PBLK86	79		118		100		118				0
02	149554-8.5/10.	104		99		122		103				0
03	149557-16/18	95		65		114		103				0
04	150553-6/8	128		89		129		119				0
05	151553-5/7	101		114		112		114				0
06	151555-9/11	90		68		99		701*				1
07	152554-7/9	96		101		112		118				0
08	152555-9/11	86		91		116		131				0
09	149554-8.5/10.MS	106		109		136		143				0
10	149554-8.5/10.MSD	99		102		124		119				0
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												

TCX = Tetrachloro-m-xylene  
DCB = Decachlorobiphenyl

ADVISORY  
QC LIMITS  
(60-150)  
(60-150)

# Column to be used to flag recovery values  
\* Values outside of QC limits  
D Surrogate diluted out



**SPECIAL INSTRUCTIONS:**

## TURNAROUND

- ☐ PECFA  
☐ WILUST  
☐ ACT 307  
☐ REPORT DRY WT  
☐ OTHER:

- ☐ 2 WEEKS (standard)  
☐ 1 WEEK  
☐ 3 DAYS *Google*  
☐ 1 DAY

SPECIAL INSTRUCTIONS: \_\_\_\_\_

PROJ. MGR.:

FFTC VAGT  
Phone 708. 691. 5020

RUSH TURNAROUND - 2 DAY (Monday is OKay, 2-17-96)  
2 DAY TAT (or 3 DAY if 3 day is Monday)

SIGNATURE	PRINT NAME	COMPANY / TITLE	DATE	TIME
RELINQUISHED BY: <i>[Signature]</i>	DAVID P. CZYRUSKI	Montgomery Ward / Marketing Director	2/1/90	
RECEIVED BY:				
RELINQUISHED BY:				
RECEIVED BY:				

C-O-C No. 010574

COO Seal H:  
92 100082

NAME OF COURIER: Rock

AIRBILL NUMBER: \_\_\_\_\_